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TM 3-6665-260-14

TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL

TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: M74
(FSN 6665-854-4147)

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 March 1974

Operator's, Organizational, Direct Support, and

General Support Maintenance Manual

TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: M74

(FSN 6665-854-4147)

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HEADQUARTERS
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WASHINGTON, D. C., 7 October 1971

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(FSN 6665-854-4147)**

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are for use by the operator and organizational maintenance personnel at the direct support maintenance level and by general support maintenance personnel. They apply to the Test Set, Chemical Agent Automatic Alarm: M74.

1-2. Record and Report Forms

a. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750.

b. The reporting of errors, omissions, and recommendations for improving this

publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, Edgewood Arsenal, ATTN: SAREA-DE-ET, Aberdeen Proving Ground, MD 21010.

1-3. Administrative Storage

Refer to TM 740-90-1 for administrative storage procedures.

1-4. Destruction to Prevent Enemy Use

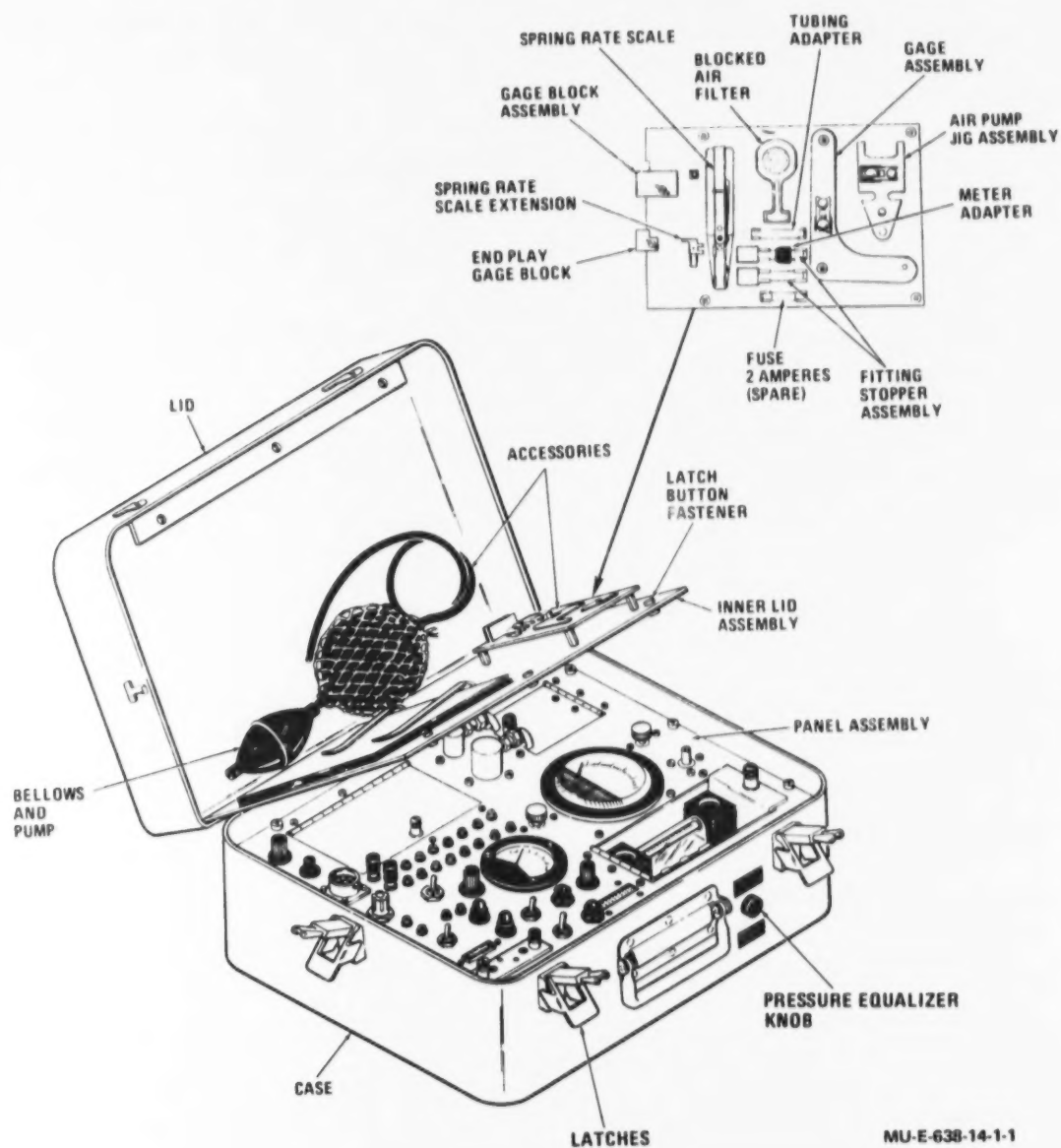
Refer to FM 5-25 for procedures on destruction of equipment and supplies.

Section II. DESCRIPTION AND DATA

1-5. Description

The M74 test set (fig. 1-1) is used to test and calibrate the Alarm, Chemical Agent Automatic: Portable M8. It consists of electrical, pneumatic, and mechanical circuits and components housed in a watertight,

portable case that has a hinged lid and folding handle. Accessories are secured under the lid by an inner lid assembly. Controls, indicators, and instruments are connected to a panel assembly fastened in the case.



MU-E-638-14-1-1

Figure 1-1. Test Set, Chemical Agent Automatic Alarm: M74.

1-6. M74 Test Set Components

Table 1-1 lists components of the M74 test set.

Table 1-1. M74 Test Set Components.

Component (fig. 1-1)	Characteristic or use
Panel assembly	Contains the electrical and pneumatic circuits for testing components of the M43 detector and the M42 alarm.
Tubing adapter	Provides connection between pneumatic tubing and detector unit chassis ports.
Air pump jig assembly	Used to align the air pump and the electrical connector of the M43 detector pump unit.
Meter adapter	Used to adapt pneumatic tubing to flow rate meter port.
Gage assembly	Used to align the switch bracket assembly onto the M43 detector chassis assembly.
Spring rate scale	Used to measure the spring tension of the M43 detector pump assembly peristaltic pump tube guide.
Gage block assembly	Used to align worm gear shaft and the vertical shaft of the M43 detector pump unit.
End play gage block	Used to establish end play tolerance of the M43 detector pump unit worm gear shaft.

Component (fig. 1-1)	Characteristic or use
Blocked air filter	Blocks airflow for leak tests in the inlet area of the M43 detector.
Fitting stopper assembly	Provides a means of blocking fluid ports and fittings in the M43 detector chassis, the pump unit, and the detector cell.
Bellows and pump	Connects to PRESSURE PORT during troubleshooting of M43 detector to pressurize the pneumatic system.
Spring rate scale extension	Connects the M43 detector pump unit shoulder pin to the spring rate scale for measurement of spring tension and measures the height of the pump unit shoulder pin.
Fuse, 2 AMP	Replacement fuse for F1.

1-7. Tabulated Data

All data are approximate.

Length	18 in.
Width	21 in.
Height	10 in.
Weight	29 lb.
Operating Temperature Range	0° to 120° F
Storage Temperature	-65° to +160° F
Power Requirements	24 to 36 vdc, 2 amperes

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

2-1. General

This section gives the purpose and use of each control and instrument used during operation of the M74 test set. All controls and instruments used during operation are mounted on the panel (fig. 2-1). The PRESSURE EQUALIZER knob is located on the case (fig. 1-1).

2-2. Electrical Controls

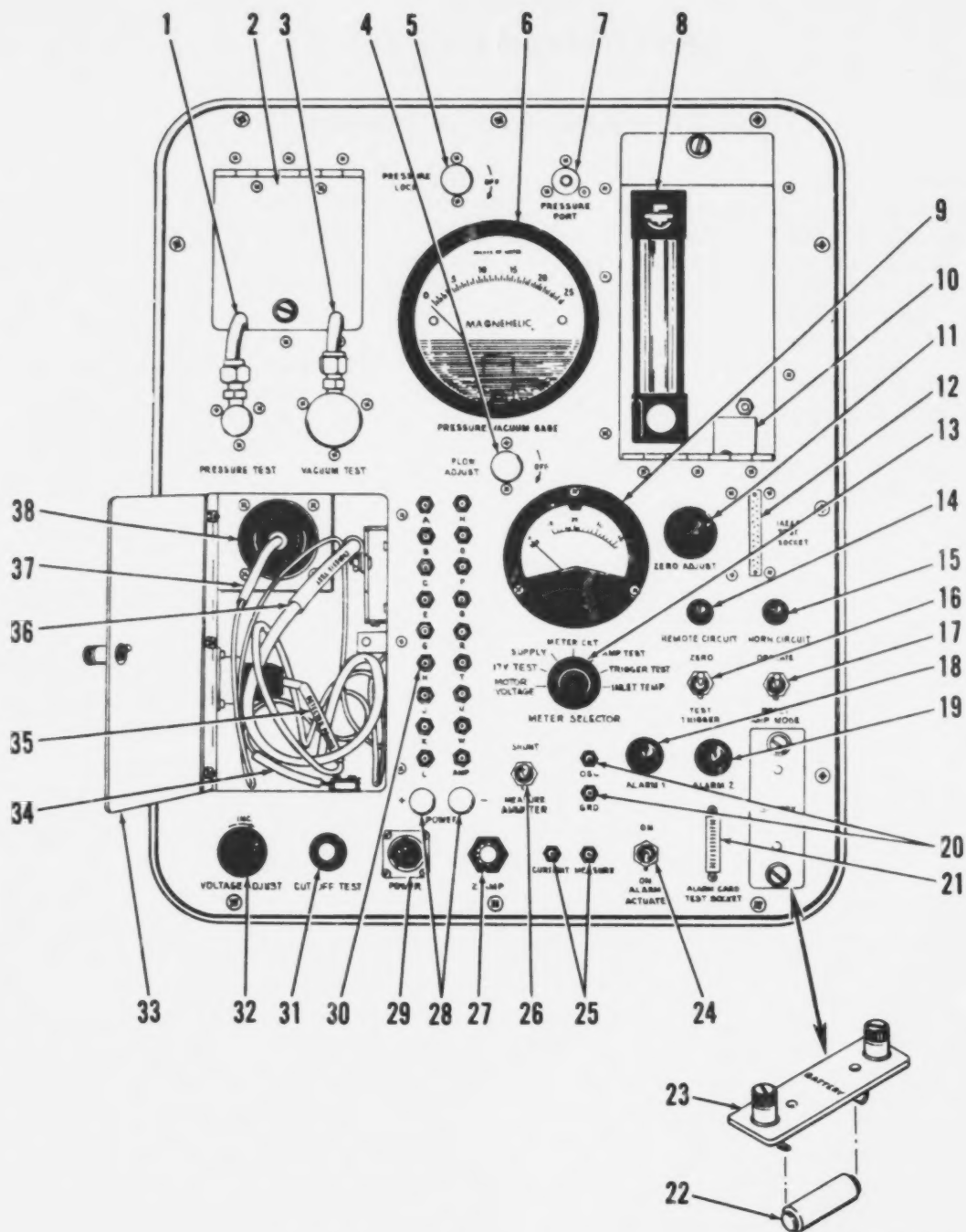
a. *METER SELECTOR Switch (S1).* METER SELECTOR switch (S1) (13, fig. 2-1) is a rotary switch that connects the following inputs to ammeter (M1) (9):

(1) *MOTOR VOLTAGE position:* Connects the M43 detector pump motor input voltage, which is controlled by VOLTAGE ADJUST variable resistor (R11) (32).

(2) *17V TEST position:* Connects the 17 vdc output of the M43 detector electronic module.

(3) *SUPPLY position:* Connects the input dc voltage supplied to the M74 test set.

(4) *METER CIRCUIT position:* Monitors the voltage in the M43 detector meter circuit.



MU-E-638-14-2-1

Figure 2-1. M74 test set panel assembly, top view.

- 1 PRESSURE TEST tubing
- 2 Tubing storage door
- 3 VACUUM TEST tubing
- 4 FLOW ADJUST valve
- 5 PRESSURE LOCK valve
- 6 PRESSURE-VACUUM GAGE (M2)
- 7 PRESSURE PORT adapter
- 8 Flow rate meter
- 9 Ammeter (M1)
- 10 Flow rate meter bracket
- 11 ZERO ADJUST variable resistor (R10)
- 12 1A2A4 TEST SOCKET (J1)
- 13 METER SELECTOR switch (S1)
- 14 REMOTE CIRCUIT indicator (DS1)
- 15 HORN CIRCUIT indicator (DS2)
- 16 TRIGGER switch (S2)
- 17 AMP MODE switch (S3)
- 18 ALARM 1 indicator (DS4)
- 19 ALARM 2 indicator (DS3)
- 20 OSC, GRD tip jacks (TP21, TP22)
- 21 ALARM CARD TEST SOCKET (J4)
- 22 Battery (BT1)
- 23 BATTERY cover
- 24 ALARM ACTUATE switch (S6)
- 25 CURRENT MEASURE tip jacks (TP19, TP20)
- 26 AMMETER switch (S4)
- 27 2 AMP fuse (F1)
- 28 POWER binding posts (E1, E2)
- 29 POWER connector (J2)
- 30 Tip jacks (TP1 through TP18)
- 31 CUT-OFF TEST switch (S5)
- 32 VOLTAGE ADJUST variable resistor (R11)
- 33 CABLE STORAGE door
- 34 PUMP POWER cable
- 35 DETECTOR POWER cable
- 36 CHASSIS TEST cable
- 37 INLET TEMP cable
- 38 Paddle assembly

(5) **AMP TEST position:** Connects the M43 detector electronics module amplifier output, which is adjusted by ZERO ADJUST variable resistor (R10) (11).

(6) **TRIGGER TEST position:** Monitors the current flow in the cell simulator loop, when TRIGGER switch (S2) (16) is set to TEST.

(7) **INLET TEMP position:** Monitors the temperature cycling of the air inlet heater.

b. ZERO ADJUST Variable Resistor (R10). ZERO ADJUST variable resistor (R10) (11) adjusts the operating level of the M43 detector electronics module amplifier.

c. TRIGGER Switch (S2). TRIGGER switch (S2) (16) (when set to TEST position) in conjunction with battery (BT1) (22), METER SELECTOR switch (S1) (13), and ammeter (M1) (9) form a loop that stimulates M43 detector cell output in the presence of agent.

d. AMP MODE Switch (S3). AMP MODE switch (S3), (17), when set to RESET position,

disables the M43 detector electronics module trigger and network circuits to return the M43 detector to a ready state.

e. AMMETER Switch (S4). AMMETER switch (S4) (26) (in MEASURE position) allows measurement of current at the CURRENT MEASURE tip jacks (TP19, TP20) (25).

f. ALARM ACTUATE Switch (S6). ALARM ACTUATE switch (S6) (24), when set to ON, applies a simulated alarm signal to the M42 alarm circuit card.

g. 2 AMP Fuse (F1). 2 AMP fuse (F1) (27) provides overcurrent protection for the electrical circuits of the M74 test set.

h. CUT-OFF TEST Switch (S5). CUT-OFF TEST switch (S5) (31) applies a cut-off signal to the voltage regulator of the pump unit to assure that the pump motor will stop when an alarm condition exists.

i. VOLTAGE ADJUST Variable Resistor (R11). VOLTAGE ADJUST variable resistor (R11) (32) adjusts the input voltage to the M43 detector pump unit.

2-3. Electrical Instruments

a. Ammeter (M1). Ammeter (M1) (9, fig. 2-1) is a 100-microampere meter that indicates inputs selected by METER SELECTOR switch (S1) (13).

b. HORN CIRCUIT Indicator (DS2). HORN CIRCUIT indicator (DS2) (15) (with associated electronics components) monitors the output of the M43 detector electronics module trigger circuit (normally applied to the M43 detector horn assembly).

c. REMOTE CIRCUIT Indicator (DS1). REMOTE CIRCUIT indicator (DS1) (14) (with associated electronic components) monitors the output of the M43 detector electronics module trigger circuit (normally applied to the M42 alarm unit).

d. ALARM 1 Indicator (DS4). ALARM 1 indicator (DS4) (18) monitors the output of the M42 alarm circuit card assembly normally applied to the M42 alarm loudspeaker.

e. ALARM 2 Indicator (DS3). ALARM 2 indicator (DS3) (19) monitors the output of the M42 alarm circuit card, normally applied to the ALARM indicator on the M42 alarm.

f. Paddle Assembly. Paddle assembly (38) is part of the INLET TEMP cable (37). The paddle assembly is used when troubleshooting

the M43 detector to insure correct air inlet temperature.

g. *INLET TEMP Cable.* INLET TEMP cable (37) connects the output of the paddle assembly to ammeter (M1) (9) during the INLET TEMP test of the M43 detector.

h. *CHASSIS TEST Cable.* CHASSIS TEST cable (36) provides an interconnection between the M74 test set and the M43 detector.

i. *DETECTOR POWER Cable.* DETECTOR POWER cable (35) provides power from the M74 test set to the M43 detector.

j. *PUMP POWER Cable.* PUMP POWER cable (34) provides power from the M74 test set to the M43 detector pump assembly.

2-4. Pneumatic Controls

a. *FLOW ADJUST Valve.* The FLOW ADJUST valve (4, fig. 2-1) regulates the rate of flow in the vacuum circuit.

b. *PRESSURE LOCK Valve.* The PRES-

SURE LOCK valve (5) maintains or releases the pressure in the pressure circuit.

c. *PRESSURE EQUALIZER Knob.* The PRESSURE EQUALIZER knob (fig. 1-1) is used to equalize the internal and external pressure on the case of the M74 test set.

d. *PRESSURE PORT Adapter.* The PRESSURE PORT adapter (7, fig. 2-1) permits connecting the bellows and pump (fig. 1-1) to the M74 test set during troubleshooting of the M43 detector.

2-5. Pneumatic Instruments

a. *PRESSURE-VACUUM GAGE (M2).* PRESSURE-VACUUM GAGE (M2) (6, fig. 2-1) indicates positive or negative pressures in inches of water.

b. *Flow Rate Meter.* The flow rate meter (8) measures the rate of airflow through the vacuum line.

Section II. OPERATION

2-6. General

This section describes preoperational and shutdown procedures for the M74 test set. The operator is authorized to replace the 2 AMP fuse (27, fig. 2-1), the battery (22), and any of the accessories found defective during operation. Appropriate sections of the direct support and general support maintenance manual for the M43 detector and M42 alarm contain operating instructions for the M74 test set.

2-7. Preparation for Use

a. Place M74 test set on a flat surface, open PRESSURE EQUALIZER knob (fig. 1-1), release the four latches, and remove lid.

b. Press three latch button fasteners (fig. 1-1) that secure the inner lid assembly, and open inner lid assembly.

c. Turn SLOW ADJUST valve (4, fig. 2-1) and PRESSURE LOCK valve (5) fully counterclockwise.

d. Remove bellows and pump (fig. 1-1), fitting stoppers, and tubing adapter from inner lid assembly.

e. Attach bellows and pump to PRESSURE PORT adapter (7, fig. 2-1).

f. Open tubing storage door (2). Insert fitting stopper in PRESSURE TEST tubing (1).

g. Pressurize system (alternately squeeze and release bulb of bellows and pump) until PRESSURE-VACUUM GAGE (6) indicates 15 inches of water.

h. Turn PRESSURE LOCK to OFF (fully clockwise). Observe that pressure holds within 1 inch of water for 1 minute.

i. Remove bellows and pump from PRESSURE PORT. Insert tubing adapter in VACUUM TEST tubing (3), and attach bellows and pump to the tubing adapter.

j. Block flowmeter fitting of flow rate meter bracket (10) by using meter adapter (fig. 1-1) and fitting stopper assembly.

k. Pressurize system until PRESSURE-VACUUM GAGE (6, fig. 2-1) indicates 0.5 inch of water. Observe that indication does not increase more than 1 inch of water in 1 minute.

l. Remove bellows and pump, fitting stoppers, and tubing adapter and install in inner lid assembly.

m. Set METER SELECTOR switch (13) to TRIGGER TEST.

n. Set TRIGGER switch (16) to TEST. Observe that ammeter (9) indicates full scale.

o. Release TRIGGER switch (16). Observe that ammeter (9) decreases to below zero.

p. Set AMMETER switch (26) to MEASURE.

q. Connect a power source (para 2-9) to POWER connector (29) or to POWER binding posts (28) (para 2-10).

r. Set AMMETER switch (26) to SHUNT; set METER SELECTOR switch (13) to SUPPLY. Observe that ammeter (9) indicates 24 to 36 volts.

s. Remove power source.

2-8. Shutdown Procedures

a. Disconnect power source from POWER connector (29, fig. 2-1) or from POWER binding posts (28).

b. Remove fitting stoppers (fig. 1-1), bellows and pump tubing adapter, and any mechanical alignment tools used in the test and install them in the inner lid assembly.

c. Close inner lid assembly in lid, and press the three latch button fasteners to secure inner lid assembly.

d. Coil the PRESSURE TEST tubing (1, fig. 2-1) and the VACUUM TEST tubing (3), and install them in the storage compartment; secure tubing storage door (2).

e. Install cables in the CABLE STORAGE compartment; secure CABLE STORAGE door (33).

f. Lower the flow rate meter bracket (10) to the horizontal position and secure.

g. Turn FLOW ADJUST valve (4) and PRESSURE LOCK valve (5) fully counterclockwise.

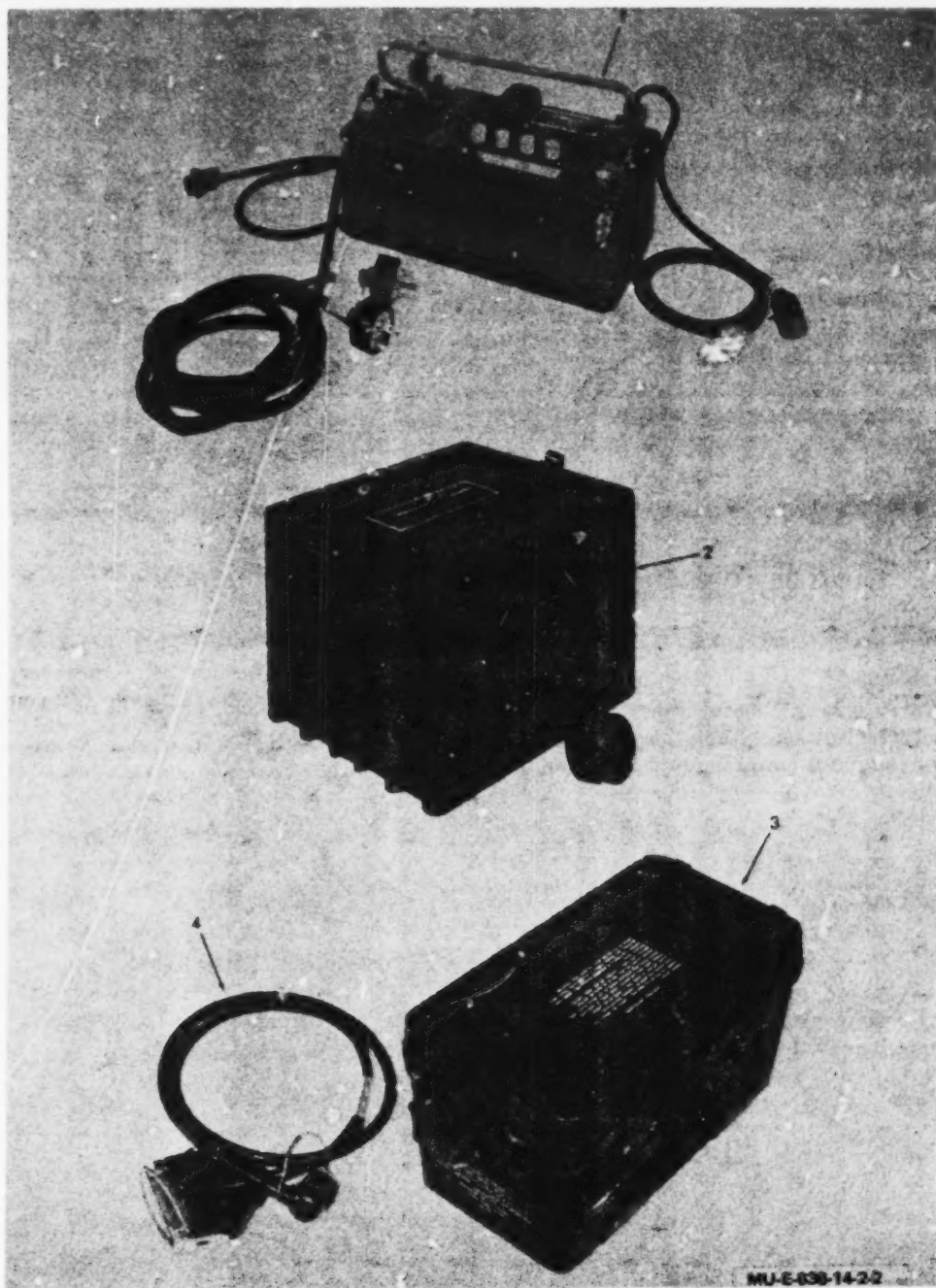
h. Install lid (fig. 1-1) on case; secure lid with four latches.

Section III. OPERATION OF MATERIEL USED IN CONJUNCTION WITH M74 TEST SET

2-9. Power Sources

Figure 2-2 shows power sources that may be used with the M74 test set. Table 2-1 contains characteristics of typical power sources that may

be used with the M74 test set. However, any power source supplying 24 to 36 vdc at 2 amperes can be used.



- | | |
|--|---|
| 1 Power Supply, Chemical Agent Automatic Alarm:
M10 | 3 Battery Assembly, BB-501/U |
| 2 BA-3517/U Battery, Dry, Medium Duty | 4 Cable Assembly, Power, Electrical: M168 |

Figure 2-2. Typical power sources.

Table 2-1. Characteristics of Typical Power Sources
for M74 Test Set.

Power source	Characteristics
BA-3517/U battery (2, fig. 2-2)	Type: Manganese-alkaline Operating Range: +20° to +120° F. Open Circuit Volt- age: 36 volts dc. Operating Life at 70° F.: 100 hr/ 2 watts
BB-501/U battery assembly (3) with	Type: Nickel-cadmium Operating Range: -40° to 165° F.

Power source	Characteristics
M168 cable assembly (4)	Open Circuit Voltage: 24 volts dc. Operating Life at 70° F.: 155 hr/ 2 watts
M10 power supply (1)	Input Voltage: 50 to 400 Hz, 115 or 220 volts Output Voltage: 24 volts dc.

2-10. Power Connections

The M74 test set is supplied electrical power through a POWER connector (29, fig. 2-1) or through the POWER binding posts (28).

CHAPTER 3

OPERATOR'S MAINTENANCE

Section I. FUSE (F1)

3-1. Removal

- a. Turn cap of 2 AMP fuse (27, fig. 2-1) counterclockwise, and remove fuse from fuseholder.
- b. Separate defective fuse from fuseholder.

3-2. Installation

- a. Remove spare fuse (fig. 1-1) from clips in inner lid assembly.
- b. Insert fuse in fuseholder cap. Rotate cap clockwise to secure it in fuseholder.

Section II. BATTERY (BT1)

3-3. Removal

- a. Unscrew BATTERY cover (23, fig. 2-1) fasteners.

CAUTION

Lift, do not pull, BATTERY cover away from panel assembly or the battery clip wires will be damaged.

- b. Remove battery (22) from between battery clips on rear of BATTERY cover (23).

3-4. Installation

- a. Install fresh battery between clips; observe polarity markings.
- b. Install BATTERY cover (23) in panel assembly and secure.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

4-1. New Materiel

a. After unpacking the M74 test set, check the materiel received using figure 1-1 as a guide to insure that no components are missing.

b. Visually inspect for damage that may impair use of the equipment.

(1) Pay particular attention to the flow rate meter (8, fig. 2-1), ammeter (9), and PRESSURE-VACUUM GAGE (6).

(2) Open the tubing storage door (2). Uncoil the PRESSURE TEST tubing (1) and the VACUUM TEST tubing (3), and inspect them for damage or unserviceability. Coil the tubing, replace tubing in compartment, and secure the door.

(3) Open the CABLE STORAGE door (33). Remove the PUMP POWER cable (34), DETECTOR POWER cable (35), and CHASSIS TEST cable (36). Examine each cable for damage.

(4) Unscrew the paddle assembly (38) from its housing, remove it, and inspect the INLET TEMP cable (37) for damage. Replace the paddle assembly in its housing and secure.

(5) Coil the cables loosely into the compartment and close and secure the CABLE STORAGE door (33).

c. Install a battery (para 3-3a and para 3-4).

4-2. Used Materiel

a. Used materiel will be processed the same as new materiel (para. 4-1).

b. Inspect the outside of the case for chipped paint. Clean, prime, and touch-up with paint (TTE-529-27093) or equivalent.

NOTE

Do not paint over the identification, warning, and instruction plates.

Section II. TROUBLESHOOTING

4-3. General

This section provides troubleshooting information to aid organizational maintenance personnel in locating defective components and making authorized repairs on the M74 test set.

4-4. Troubleshooting Table

Each malfunction in table 4-1 is followed by corresponding probable causes and corrective actions.

Table 4-1. Troubleshooting

Item No.	Malfunction	Probable cause	Corrective action
1	Ammeter does not indicate in any position of METER SELECTOR switch except TRIGGER TEST.	a. Open fuse. b. Defective power source.	Replace fuse F1 (para 3-1 and 3-2). Connect operative power source (para 2-9 and 2-10).
2	Ammeter does not indicate when METER SELECTOR switch is in TRIGGER TEST position and TRIGGER switch is held to TEST.	Defective battery (BT1).	Replace battery (para 3-3 and 3-4).
3	During trigger test, HORN CIRCUIT indicator lights but REMOTE CIRCUIT indicator does not light.	Open lamp.	Replace lamp DS1 (para 4-5).
4	During trigger test, REMOTE indicator lights but HORN CIRCUIT indicator does not light.	Open lamp.	Replace lamp DS2 (para 4-5).

Table 4-1. Troubleshooting —Continued

Item No.	Malfunction	Probable cause	Corrective action
5	ALARM 1 and ALARM 2 indicators do not light when ALARM ACTUATE switch is set to ON.	a. If both indicators are off, defective battery (BT1). b. If one indicator is off, defective lamp.	Replace battery (para 3-3 and 3-4). Replace lamp DS3 or DS4 (para 4-5).
6	Pneumatic pressure system will not retain pressure.	Defective bellows and pump.	Replace bellows and pump (fig. 1-1).

Section III. MAINTENANCE

4-5. Lamps

a. *Description.* The M74 test set contains four indicator lamps: REMOTE CIRCUIT indicator (DS1) (14, fig. 2-1), HORN CIRCUIT indicator (DS2) (15), ALARM 1 indicator (DS4) (18), ALARM 2 indicator (DS3) (19), and associated lenses. All lamps and lenses are accessible from the front of the panel assembly. Organizational maintenance personnel are authorized to test and replace defective indicator lamps and lenses.

b. *Test.*(1) *Preliminary procedure*

(a) Position AMMETER switch (26) to SHUNT.

(b) Connect 24-volt power source to POWER binding posts (28) or to POWER connector (29) (pin A is positive and pin B is negative).

(2) *Horn indicator circuit and remote indicator circuit.* The following tests require the use of two insulated jumper wires and a 2,500-ohm $\pm 5\%$ resistor. Momentarily connect jumper wires and resistor to specified contacts of 1A2A4 TEST SOCKET (J1) (12).

(a) Jumper wire between pins R and W of J1; only the HORN CIRCUIT indicator (15) lights.

(b) Jumper wire between pins H and W of J1; only the REMOTE CIRCUIT indicator (14) lights.

(c) Resistor between pins Q and T of J1; only the REMOTE CIRCUIT indicator (14) lights.

(d) Jumper wires connect pins R, H, and W of J1; only the HORN CIRCUIT indicator (15) lights.

(e) Jumper wire between pins R and W, and resistor between pins Q and T of J1; only the HORN CIRCUIT indicator (15) lights.

(f) Jumper wires connect pins R, H, and W, and resistor between pins Q and T of J1; both HORN CIRCUIT indicator (15) and REMOTE CIRCUIT indicator (14) light.

(3) *Alarm indicating circuit.* The following tests require the use of two insulated jumper wires.

(a) Jumper wires between pins D and E and between pins C and H of the ALARM CARD TEST SOCKET (21); ALARM 2 indicator (19) lights.

(b) Jumper wires between pins D and E of ALARM CARD TEST SOCKET (21) and between OSC tip jack (20) and pin H of ALARM CARD TEST SOCKET (21); ALARM 1 indicator (18) lights.

c. *Removal.*

(1) *REMOTE CIRCUIT indicator (DS1) (14) and indicator lens:*

(a) Remove power from M74 test set.

(b) Unscrew and remove indicator lens and lamp.

(c) Using sharp instrument, pry lamp free from lens, and remove lamp.

(2) *HORN CIRCUIT indicator (DS2) (15) and indicator lens.* HORN CIRCUIT indicator (DS2) is removed in the same manner as REMOTE CIRCUIT indicator (DS1) ((1) above).

(3) *ALARM 1 indicator (DS4) (18) and indicator lens.*

(a) Remove power from M74 test set.

(b) Unscrew and remove indicator lens.

(c) Press indicator lamp down, turn it counterclockwise and remove.

(4) *ALARM 2 indicator (DS3) (19) and indicator lens.* ALARM indicator (DS3) is removed in the same manner as ALARM 1 indicator (DS4) ((3) above).

d. Installation.

- (1) *REMOTE CIRCUIT indicator (DS1) (14) and indicator lens.*

- (a) Remove power from M74 test set.
- (b) Insert lamp in indicator lens.
- (c) Screw indicator lens into panel.

- (2) *HORN CIRCUIT indicator (DS2) (15) and indicator lens.* HORN CIRCUIT indicator (DS2) is installed in the same manner as REMOTE CIRCUIT indicator (DS1) ((1) above).

- (3) *ALARM 1 indicator (DS4) (18) and indicator lens.*

- (a) Remove power from M74 test set.
- (b) Aline lamp bayonets with lamp housing slots.
- (c) Press lamp down, turn it clockwise, and release.
- (d) Screw lens into panel.

- (4) *ALARM 2 indicator (DS3) (19) and indicator lens.* ALARM 2 indicator (DS3) is installed in the same manner as ALARM 1 indicator (DS4) ((3) above).

4-6. Knobs

- a. Description.* The M74 test set front panel contains three knobs that are attached by setscrews: METER SELECTOR switch (13, fig. 2-1), ZERO ADJUST variable resistor (11), and

VOLTAGE ADJUST variable resistor (32).

- b. Removal.*

- (1) Turn knob fully counterclockwise.
- (2) With a pencil, mark the position of the knob pointer on the panel.
- (3) Insert hex key in setscrew access hole, loosen setscrew until knob is free on shaft, and lift knob from shaft.

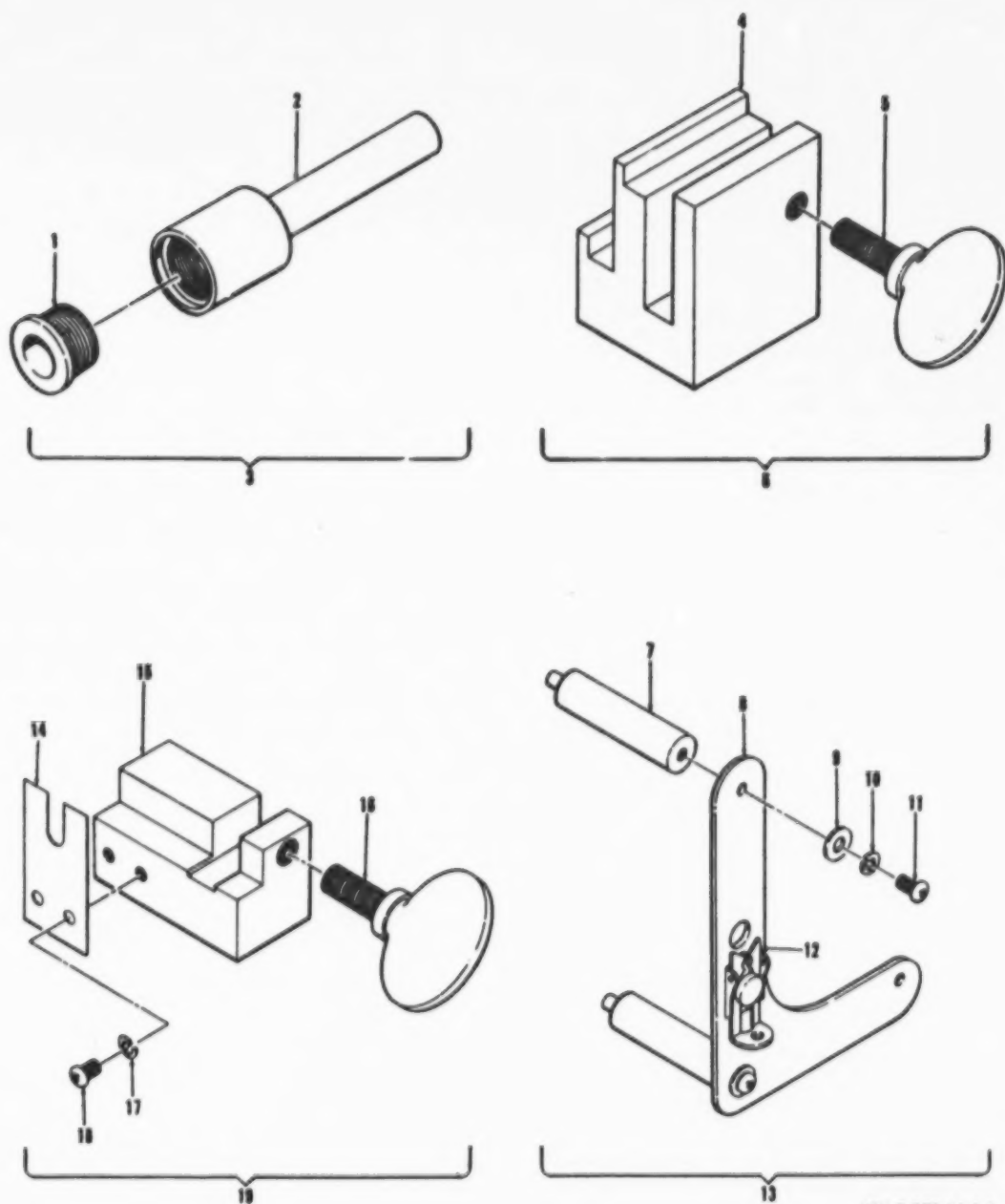
- c. Installation.*

- (1) Using hex key, loosen setscrew of replacement knob.
- (2) Place knob on shaft so that knob pointer is aligned with mark on panel.
- (3) Tighten setscrew. Remove mark from panel.

4-7. Fitting Stopper Assembly

- a. Description.* The fitting stopper assembly (3, fig. 4-1) is composed of a fluid fitting (1) installed in a fitting stopper (2). It provides a means of blocking male or female pneumatic fittings during tests.

- b. Repair.* A damaged fluid fitting (1) may be replaced by unscrewing it counterclockwise (use another fitting stopper assembly) while holding the fitting stopper (2). Dampen threads of new fluid fitting with water before screwing it into fitting stopper (clockwise).



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- | | | |
|----------------------------|------------------|------------------------|
| 1 Fluid fitting | 8 Gage plate | 14 End play gage |
| 2 Fitting stopper | 9 Washer | 15 Gage block |
| 3 Fitting stopper assembly | 10 Lockwasher | 16 Thumb screw |
| 4 Gage block | 11 Screw | 17 Lockwasher |
| 5 Thumb screw | 12 Snap fastener | 18 Screw |
| 6 Gage block assembly | 13 Gage assembly | 10 End play gage block |
| 7 Post | | |

Figure 4-1. Alinement and test components, exploded view.

4-8. Gage Block Assembly

a. *Description.* The gage block assembly (6, fig. 4-1) is composed of a thumbscrew (5) installed in a gage block (4). It is used during repair of the M43 detector pump assembly to align the pump unit worm-gear shaft and vertical shaft.

b. *Repair.* Replace a damaged thumbscrew by unscrewing (counterclockwise) it from the gage block and screwing (clockwise) a new thumbscrew into the gage block.

4-9. Gage Assembly

a. *Description.* The gage assembly (13, fig. 4-1) is composed of two posts (7), a gage plate (8), a snap fastener (12), two flat washers (9), two lockwashers (10), and two screws (11). The gage assembly determines the correct alignment of the screw bracket assembly to the detector chassis assembly.

b. *Repair.* Replace damaged screw (11), lockwasher (10), or washer (9), which attach the posts (7) to the gage plate (8), by unscrewing (counterclockwise) and removing damaged component, and installing new component.

4-10. End Play Gage Block

a. *Description.* The end play gage block (19, fig. 4-1) is composed of a thumbscrew (16) and an end play gage (14) attached to a gage block (15) by two screws (18) and lockwashers (17). The end play gage block is used to establish end play tolerance of the M43 detector pump unit worm-gear shaft during repair.

b. *Repair.*

(1) *Thumbscrew.* Replace a damaged thumbscrew (16) by unscrewing (counterclockwise) it from the gage block (15) and screwing (clockwise) a new thumbscrew into the gage block.

(2) *End play gage and attaching hardware.*

(a) Unscrew two screws (18) attaching end play gage (14) to gage block (15).

(b) Remove screws, lockwashers (17), and end play gage from gage block.

(c) Replace damaged component with new component.

(d) Install lockwashers on screws and position end play gage on gage block.

(e) Insert and tighten screws through end play gage into gage block.

CHAPTER 5

FUNCTIONING OF EQUIPMENT

Section I. ELECTRONIC AND ELECTRICAL CIRCUITS

5-1. General Description

The electronic circuits are used to check the operational status of the M42 alarm circuit card and the M43 detector electronic module, pump motor, air inlet heater cycling, and electronic chassis components. Electrical checks are accomplished through a series of switches, meters, indicators, and tip jacks. A replaceable, plug-in type circuit-card assembly contains the balance of the electronic components of the M74 test set. Before any electrical checks can be accomplished, a power source (having the power characteristics of the power supply furnished with the M43 detector) must be connected to POWER connector (J2) or the POWER bindings posts (E1 and E2).

5-2. Functional Description (fig. 5-1)

a. The M43 detector cell output is simulated by circuits of the M74 test set to provide a check of the stability and reaction to cell activation

of the M43 detector electronic module.

b. A variable input is supplied to the M43 detector pump assembly to test the pump motor and regulator operation.

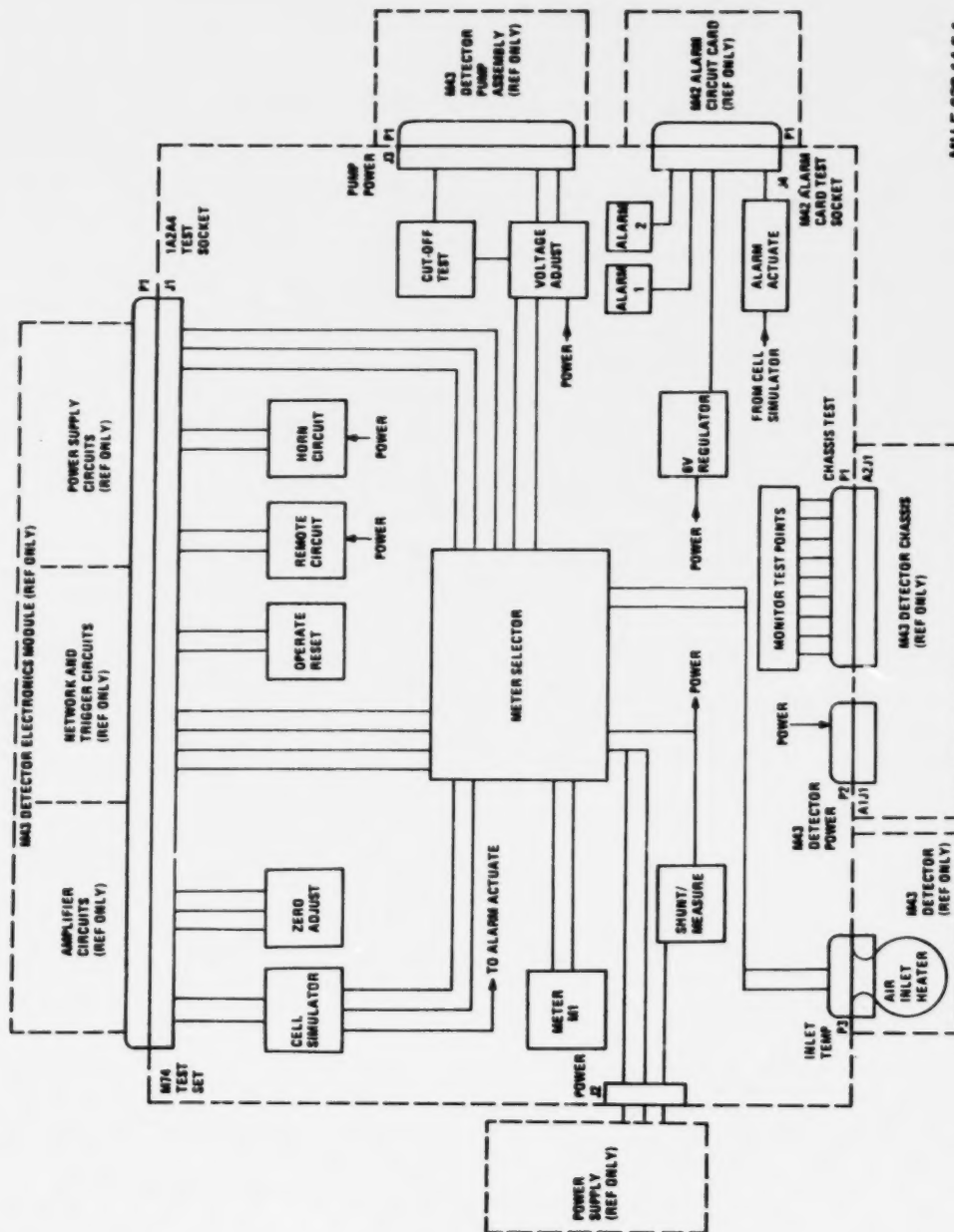
c. The M43 detector controls and instruments are duplicated by controls and instruments of the M74 test set.

d. Monitor test points are provided for checking resistance and continuity of the M43 detector chassis components and wiring.

e. A thermal resistor, installed in the M74 test set paddle assembly (P3), measures the M43 detector air inlet temperature.

f. Operating power for the M42 alarm circuit card is supplied by a 6-volt regulator. The alarm circuit is activated by the alarm actuate circuit.

g. The outputs of the M43 detector electronic module and pump assembly and the input power are monitored on ammeter (M1), as selected by the setting of the METER SELECTOR switch (S1).



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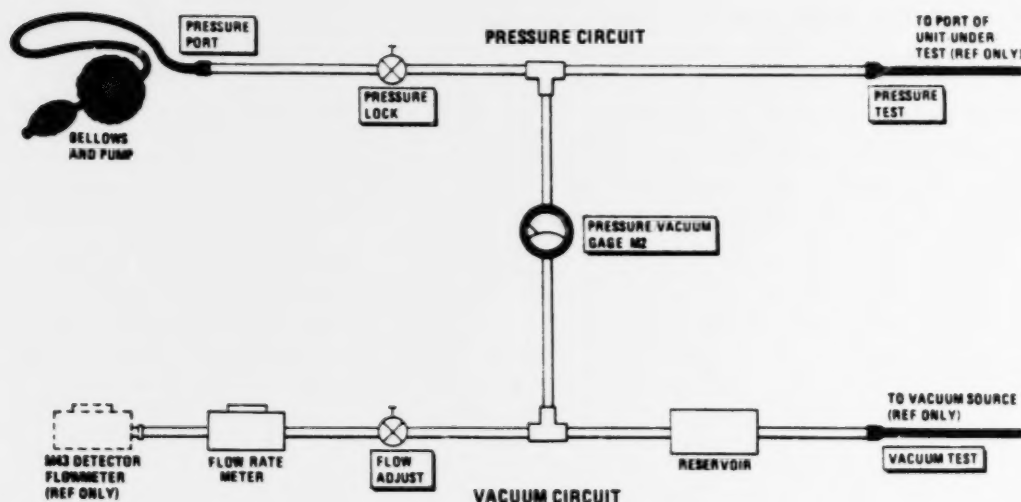
Figure 5-1. M74 test set electrical block diagram.

Section II. PNEUMATIC SYSTEM

5-3. General Description

The pneumatic system (fig. 5-2) of the M74 test set contains a vacuum circuit and a pressure

circuit. A PRESSURE-VACUUM GAGE serves as a monitor for both circuits.



MU-E-638-14-5-2

Figure 5-2. M74 test set pneumatic system.

5-4. Pressure Circuit

The pressure circuit contains a PRESSURE PORT connector for connection of the bellows and pump (carried on the inner lid assembly), a PRESSURE LOCK valve for retaining pressure in the system during tests, and a PRESSURE TEST flexible tube for attachment to ports of the unit under test.

5-5. Vacuum Circuit

The vacuum circuit contains VACUUM TEST flexible tubing for attachment of an M43 detector pump assembly or other vacuum source, a reservoir for dampening pulsations, a FLOW ADJUST valve for establishing the desired rate-of-flow, a calibrated flow rate meter for comparison tests, and a fitting for connection of an M43 detector flow rate meter.

CHAPTER 6

DIRECT SUPPORT MAINTENANCE

Section I. TROUBLESHOOTING

6-1. General

a. This section is intended as a guide for locating probable troubles when symptoms are known. An understanding of how the M74 test set functions (Chapter 5) will be an invaluable asset in locating malfunctions.

b. Direct support maintenance personnel are authorized to resolder defective solder joints and to resolder or replace terminal lugs when necessary. Solder all replacement terminal lugs (solder-type and solderless-type) to wires.

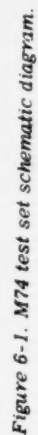
NOTE

Refer to TB SIG 222 for instructions regarding soldering techniques for printed-circuit assemblies and terminal lugs as well as for the repair of electrical circuit wires by splicing.

6-2. Schematic and Wiring Diagrams

a. Figure 6-1 is a schematic diagram of the M74 test set. The circuits of the circuit card assembly are shown for reference only.

b. Figure 6-2 is a wiring diagram of the M74 test set for use as an aid when replacing defective wires and components during maintenance.



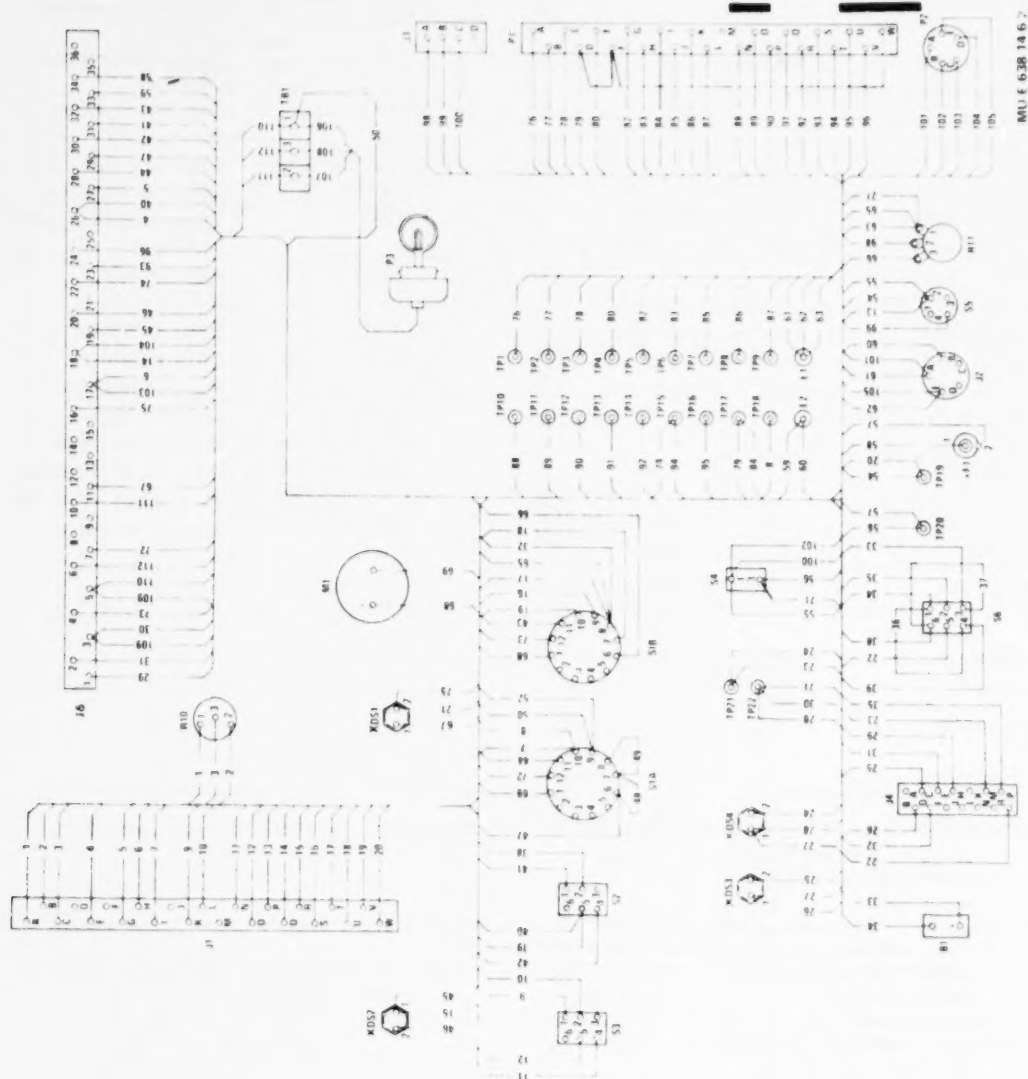


Figure 6-2. M74 test set wiring diagram.

6-3. Test Point Table

Table 6-1 lists the test points on the M74 test set panel assembly, their reference designations, and the circuits that they monitor during operation.

6-4. Troubleshooting**CAUTION**

To prevent damage to the ammeter (M1), disconnect the leads from the ammeter terminals before checking circuit continuity.

a. Check circuit continuity to isolate a defective circuit component. Use the schematic diagram (fig. 6-1) and the wiring diagram (fig. 6-2) as guides.

b. Direct support maintenance personnel are authorized to perform the corrective actions listed in table 6-2. This table should be used in conjunction with the organizational maintenance troubleshooting table (table 4-1).

Table 6-1. M74 Test Set Test Points.

Test point	Reference designation	Circuits monitored
AMP	TP18	Electronics module amplifier output.
CURRENT MEASURE	TP19 (Red) and TP20 (Blk)	M74 test set current
OSC	TP21 (Red)	Output of the M42 alarm circuit card assembly.

Table 6-1. M74 Test Set Test Points.
—Continued

Test point	Reference designation	Circuits monitored
GRD	TP22 Blk)	M42 alarm circuit card output return.
A	TP1	Zero adjust variable resistor.
B	TP2	Zero adjust variable resistor.
C	TP3	Zero adjust wiper.
E	TP4	Detector cell.
G	TP5	Detector cell.
H	TP6	Amp. out distribution.
J	TP7	Pump assembly motor common.
K	TP8	Reset switch.
L	TP9	Reset switch.
N	TP10	Reset switch.
O	TP11	Reset switch.
P	TP12	Heaters common.
Q	TP13	Remote output.
R	TP14	Cut-off distribution.
T	TP15	+24 vdc distribution.
U	TP16	Inlet heater +18 vdc
W	TP17	Heaters common.

Table 6-2. Troubleshooting.

Item No.	Malfunction	Probable cause	Corrective action
1	Ammeter (M1) (9, fig. 2-1) does not indicate in any position of METER SELECTOR switch (13).	Ammeter (M1) defective.	Replace ammeter (para 6-21).
2	Ammeter (M1) does not indicate in any position of METER SELECTOR switch except TRIGGER TEST.	a. AMMETER switch (S4) open in SHUNT position. b. Defective circuit card assembly.	Replace switch (para 6-47a). Replace circuit card assembly (para 6-53).
3	Ammeter (M1) does not indicate in MOTOR VOLTAGE, 17V TEST, and SUPPLY positions.	Defective circuit card assembly.	Replace circuit card assembly (para 6-53).
4	Ammeter (M1) does not indicate in MOTOR VOLTAGE position.	Defective VOLTAGE ADJUST variable resistor (R11).	Replace variable resistor (para 6-48).
5	Ammeter (M1) does not indicate in TRIGGER TEST position when TRIGGER switch is held to TEST.	a. Defective circuit card assembly. b. Defective TRIGGER switch (S2).	Replace circuit card assembly (para 6-53). Replace switch (para 6-47).
6	HORN CIRCUIT and REMOTE CIRCUIT indicators are lighted while TRIGGER switch is in ZERO position.	a. Open ZERO ADJUST variable resistor (R10). b. Defective circuit card assembly	Replace variable resistor (para 6-48). Replace circuit card assembly (para 6-53).

<i>Item No.</i>	<i>Malfunction</i>	<i>Probable cause</i>	<i>Corrective action</i>
7	HORN CIRCUIT indicator lights but REMOTE CIRCUIT indicator does not light during trigger test.	Defective circuit card assembly.	Replace circuit card assembly (para 6-53).
8	REMOTE CIRCUIT indicator lights but HORN CIRCUIT indicator does not light during trigger test.	Defective circuit card assembly.	Replace circuit card assembly (para 6-53).
9	Setting AMP MODE switch to RESET does not turn off REMOTE and HORN CIRCUIT indicators.	a. Defective circuit card assembly. b. Defective AMP MODE switch (S3).	Replace circuit card assembly (para 6-53). Replace switch (para 6-47a).
10	M43 detector pump assembly motor does not stop when CUT OFF TEST switch is pressed.	Defective CUT OFF TEST switch (S5).	Replace switch (para 6-47b).
11	M43 detector meter does not indicate one-half SUPPLY voltage when M43 detector is connected to M74 test set.	Defective circuit card assembly.	Replace circuit card assembly (para 6-53).
12	M43 detector meter does not indicate SUPPLY voltage when M43 detector BATTERY TEST switch is pressed and M43 detector is connected to M74 test set.	a. Power source disconnected or off.	Check power source (para 2-7g and 2-7r).
13	Ammeter indicates zero during INLET TEMP test.	a. Defective INLET TEMP cable. b. Defective circuit card assembly.	Repair or replace (para 6-61). Replace circuit card assembly (para 6-53).
14	Ammeter indicates full scale during INLET TEMP test.	a. Defective INLET TEMP cable. b. Defective circuit card assembly.	Repair or replace (para 6-61). Replace circuit card assembly (para 6-53).
15	Ammeter indication low during INLET TEMP test.	a. INLET TEMP cable open. b. Defective circuit card assembly.	Replace cable (para 6-61). Replace circuit card assembly (para 6-53).
16	ALARM 1 and ALARM 2 indicators do not light when ALARM ACTUATE switch is set to ON.	a. Open ALARM ACTUATE switch (S6). b. Defective circuit card assembly.	Replace switch (para 6-47a). Replace circuit card assembly (para 6-53).
17	M74 test set pneumatic pressure system will not retain pressure.	a. Leaking pneumatic tubing or connectors. b. Defective PRESSURE LOCK valve. c. Defective PRESSURE-VACUUM GAGE.	Replace tubing or connectors (para 6-11). Replace valve (para 6-24). Replace PRESSURE-VACUUM GAGE (para 6-18).
18	PRESSURE-VACUUM GAGE indication drops during vacuum system leak test.	a. Leaking pneumatic tubing or connectors. b. Leaking reservoir. c. Defective FLOW ADJUST valve. d. Defective PRESSURE-VACUUM GAGE.	Replace tubing or connectors (para 6-11). Replace reservoir (para 6-8). Replace valve (para 6-24). Replace PRESSURE-VACUUM GAGE (para 6-18).
19	Flow rate meter indicates incorrect flow during vacuum tests.	a. Defective pneumatic tubing or connectors. b. Defective flow rate meter. c. Defective PRESSURE-VACUUM GAGE.	Replace tubing or connectors (para 6-11). Replace flow rate meter (para 6-27). Replace PRESSURE-VACUUM GAGE (para 6-18).

Section II. PANEL ASSEMBLY

6-5. Description

The panel assembly (fig. 1-1) contains the electrical and pneumatic components of the M74 test set. The panel assembly is mounted in the M74 test set case and is secured by 12 machine screws. Direct support maintenance personnel are authorized to remove the panel assembly from the case.

6-6. Removal

a. Open case lid (fig. 6-3) by releasing four latches and raising the lid.

b. Remove 12 screws (fig. 6-3) securing the panel assembly to the case.

c. Lift panel assembly from case.

6-7. Installation

a. Position panel assembly (fig. 6-3) in case so that screw holes are aligned.

b. Install and tighten 12 screws.

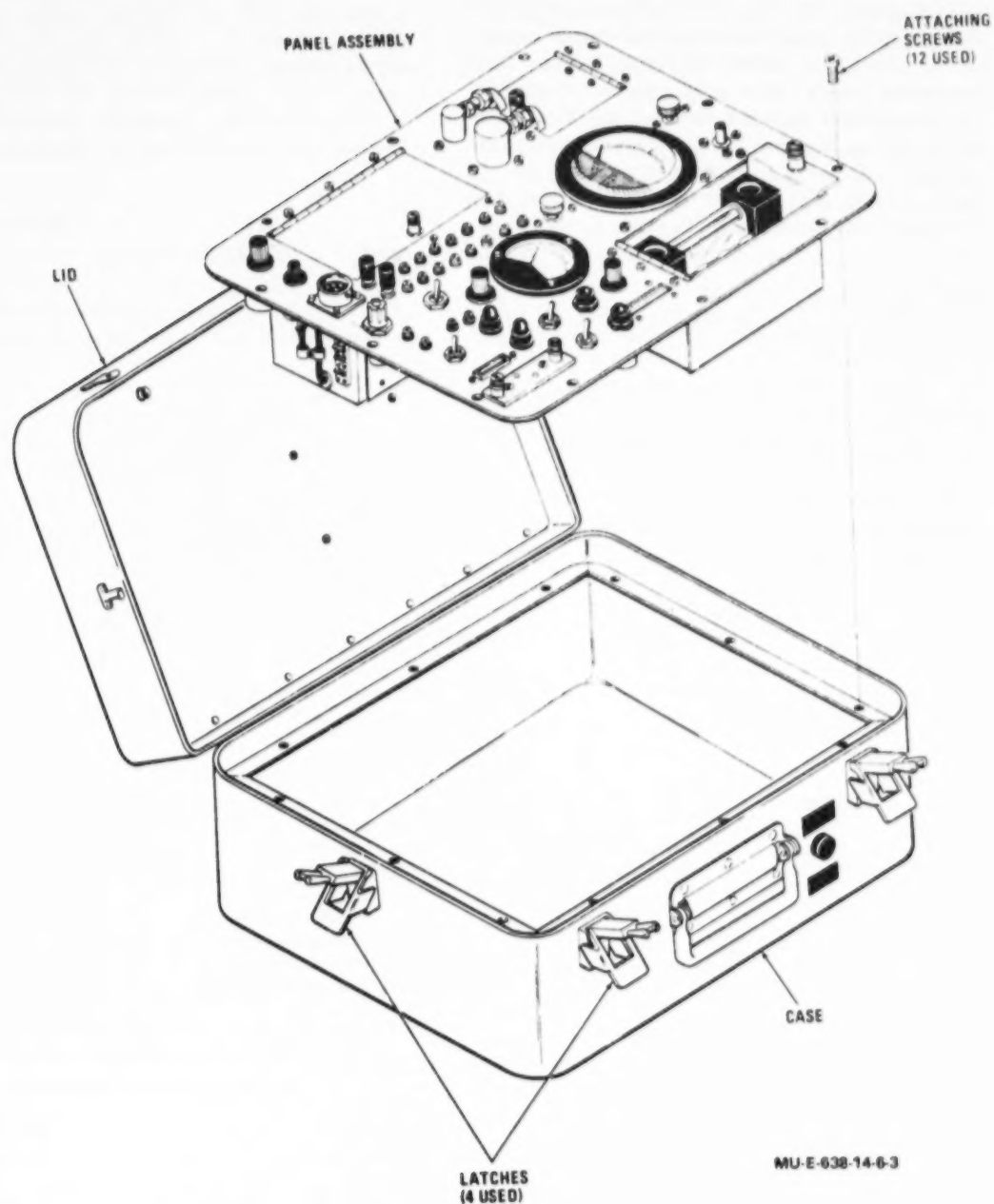


Figure 6-3. Panel assembly removed from case.

Section III. RESERVOIR

6-8. Description

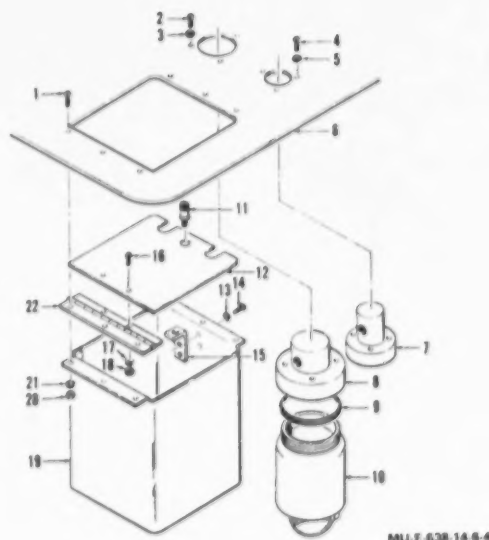
The reservoir (10, fig. 6-4) is a screw-top jar that dampens pulsations from the pump assembly to provide a stable indication on the flow rate meter (8, fig. 2-1) during tests. The reservoir is attached to the bottom of the VACUUM TEST fitting bushing (8, fig. 6-4) on the panel assembly (6) with a preformed packing (9) to insure a tight seal. Direct support maintenance personnel are authorized to replace the reservoir.

6-9. Removal

- a. Remove panel assembly (fig. 6-3) from the case (para. 6-6).
- b. Unscrew the reservoir (10, fig. 6-4) from the fitting bushing (8).
- c. Remove the preformed packing (9).

6-10. Installation

Installation of the reservoir (10) is the reverse of removal (para 6-9).



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- | | |
|---------------------|------------------|
| 1 Screw | 12 Access door |
| 2 Screw | 13 Lockwasher |
| 3 Lockwasher | 14 Screw |
| 4 Screw | 15 Latch bracket |
| 5 Lockwasher | 16 Screw |
| 6 Panel assembly | 17 Lockwasher |
| 7 Fitting bushing | 18 Nut |
| 8 Fitting bushing | 19 Enclosure |
| 9 Preformed packing | 20 Nut |
| 10 Reservoir | 21 Lockwasher |
| 11 Screw fastener | 22 Hinge |

Figure 6-4. Pneumatic bushings, reservoir, and tube storage enclosure, exploded view.

Section IV. PNEUMATIC TUBING, FITTINGS, AND CONNECTORS**6-11. Description**

Pneumatic tubing used in the M74 test set is transparent flexible plastic. A steel insert is used in the tube end to provide rigidity at the connection and to prevent leaks. Direct support maintenance personnel are authorized to replace pneumatic tubing, fittings, and connectors.

6-12. Removal

a. Remove the panel assembly (fig. 6-3) from the case (para 6-6).

b. Hold the applicable connector (1, 7, or 8, fig. 6-5) and unscrew nut (5) attaching tubing

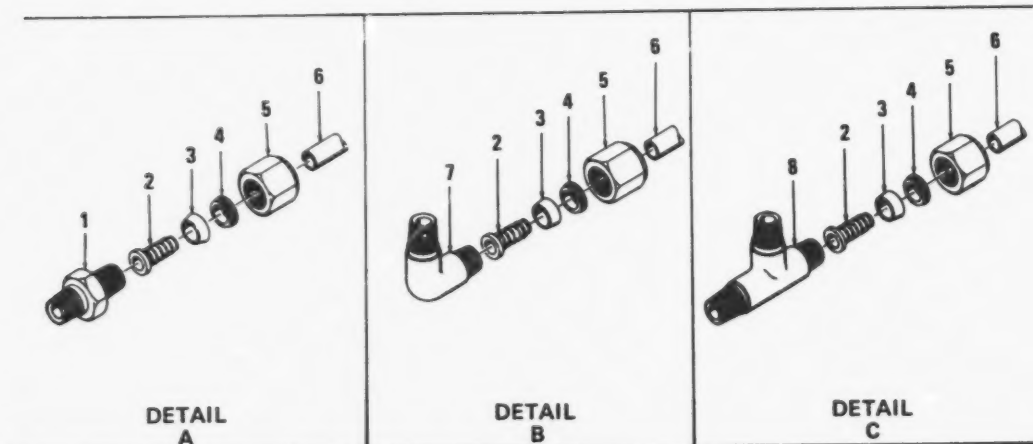
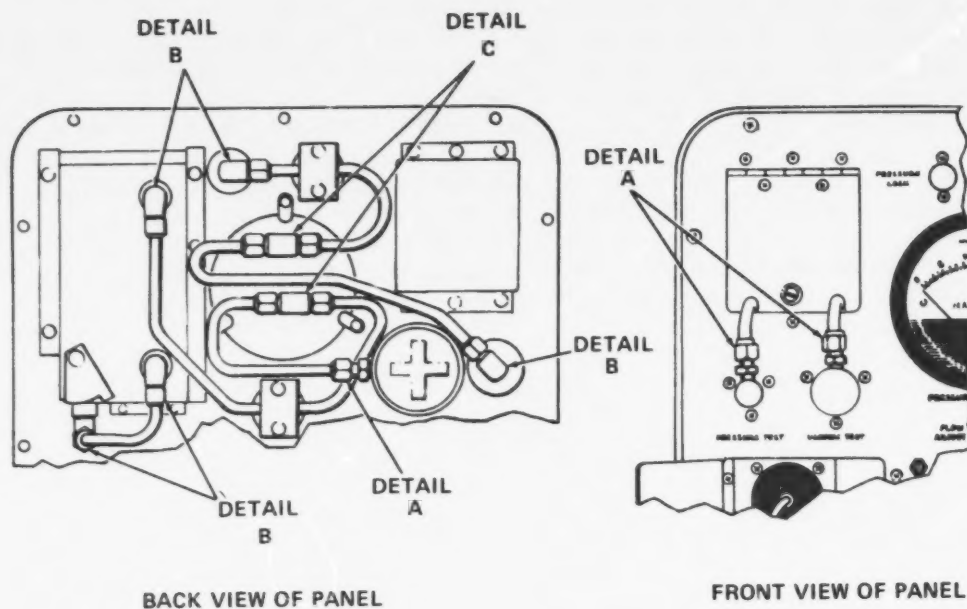
(6) to the connector.

c. Slide nut (5) back on tubing (6) and pull steel insert (2) out of tubing.

d. Remove seat (3) and flange (4) from end of tubing and slide nut (5) from tubing.

e. If the connector being replaced is one of the PRESSURE-VACUUM GAGE tee connectors (8), repeat steps *b* through *d* above for the other end of the tee connector. Then unscrew the tee connector (8) from the gage.

f. Unscrew the male connector (1) or elbow connector (7), whichever is applicable, from the component to which it is attached.



MU-E-638-14-6-6

- 1 Male connector
- 2 Insert
- 3 Seat
- 4 Flange

- 5 Nut
- 6 Tubing
- 7 Elbow connector
- 8 Tee connector

Figure 6-5. Pneumatic tubing, fittings, and connectors, locations and exploded views.

g. If pneumatic tubing is to be replaced, perform steps *b* through *d* above at the opposite end of the tubing. If the tubing is routed through the PRESSURE LOCK valve (5, fig. 2-1) or the FLOW ADJUST valve (4), turn valve knob fully counterclockwise to allow the tubing to be pulled through the valve.

h. Remove tubing from panel assembly.

6-13. Installation

a. If pneumatic tubing (6, fig. 6-5) is being replaced and is to be routed through the PRESSURE LOCK valve (5, fig. 2-1) or the FLOW ADJUST valve (4), turn valve knob fully counterclockwise before inserting tubing through holes in the valve. Route tubing as indicated in figure 6-5.

b. If the connector being replaced is one of the PRESSURE-VACUUM GAGE tee connectors (8), install the tee connector in the gage with the short stem of the tee screwed into the

gage and the connector positioned as shown in figure 6-5.

c. If one of the other connectors is being replaced, screw the male connector (1) or elbow connector (7), whichever is applicable, into the component to which it is to attach. Position the elbow connector (7) as indicated in figure 6-5.

d. Slide nut (5) on tubing (6).

e. Slide flange (4) and seat (3) on tubing (6) so that edge of seat is approximately 1/4-inch from the end of the tubing (6).

f. Install insert (2) into tubing (6) and slide nut (5) over flange (4) and seat (3).

g. Insert tubing (6) into connector (1, 7, or 8) and, while holding connector, tighten nut (5).

h. If tubing is being replaced, repeat *d* through *g* above at other end of tubing.

i. Replace panel assembly (fig. 6-3) in the case (para 6-7).

Section V. PNEUMATIC FITTING BUSHINGS AND ADAPTER

6-14. Description

The panel assembly (fig. 2-1) contains one adapter and two pneumatic fitting bushings. One fitting bushing (7, fig. 6-4) provides coupling between the PRESSURE TEST tubing (1, fig. 2-1) and the pressure system. The second fitting bushing (8, fig. 6-4) provides coupling between the VACUUM TEST tubing (3, fig. 2-1) and the vacuum system and mounting for the reservoir (10, fig. 6-4). The adapter (4, fig. 6-6) provides a means for connecting the bellows and pump (fig. 1-1) to the pressure circuit. Direct support maintenance personnel are authorized to replace the fitting bushings and the adapter.

6-15. PRESSURE TEST Fitting Bushing

a. Removal.

(1) Disconnect PRESSURE TEST tubing (para 6-12*b*) from the male connector (1, fig. 6-5) and remove the male connector (para 6-12*f*).

(2) Remove panel assembly from case (para 6-6).

(3) Disconnect tubing (para 6-12*b*) from elbow connector (7, fig. 6-5) on bottom of fitting bushing (7, fig. 6-4).

(4) Remove the elbow connector (7, fig. 6-5) from the fitting bushing (para 6-12*f*).

(5) Unscrew and remove three screws (4, fig. 6-4) and lockwashers (5) securing the fitting bushing (7) to the panel assembly (6).

b. Installation.

(1) Position the fitting bushing (7) through the panel assembly (6) so that the threaded hole in the top is positioned toward the tubing storage door (2, fig. 2-1).

(2) Align the three holes in the fitting bushing (7, fig. 6-4) with the holes in the panel assembly (6) and install and tighten three screws (4) and lockwashers (5).

(3) Install elbow connector (7, fig. 6-5) on fitting bushing (para 6-13*c*).

(4) Install male connector (1, fig. 6-5) on fitting bushing (para 6-13*c*).

(5) Reconnect tubing.

(6) Install panel assembly in case (para 6-7).

6-16. VACUUM TEST Fitting Bushing

a. Removal.

(1) Disconnect VACUUM TEST tubing (para 6-12*b*) from the male connector (1, fig. 6-5) and remove the male connector (para 6-12*f*) from VACUUM TEST fitting bushing (8, fig. 6-4).

(2) Remove panel assembly from case (para 6-6).

(3) Unscrew and remove the reservoir (para 6-9).

(4) Disconnect tubing (para 6-12b) from male connector (1, fig. 6-5) on bottom of fitting bushing (8, fig. 6-4).

(5) Remove male connector (1, fig. 6-5) from the fitting bushing (para 6-12f).

(6) Unscrew and remove three screws (2, fig. 6-4) and lockwashers (3) securing the fitting bushing (8) to the panel assembly (6).

b. Installation.

(1) Position the fitting bushing (8) through the panel assembly (6) so that the threaded hole in the top is positioned toward the tubing storage door (2, fig. 2-1).

(2) Aline the three holes in the fitting bushing (8, fig. 6-4) with the holes in the panel assembly (6) and install and tighten three screws (2) and lockwashers (3).

(3) Install male connectors (1, fig. 6-5) on the fitting bushings (para 6-13c).

(4) Reconnect tubing.

(5) Install reservoir (para 6-10).

(6) Install the panel assembly in the case (para 6-7).

6-17. PRESSURE PORT Adapter

a. Removal.

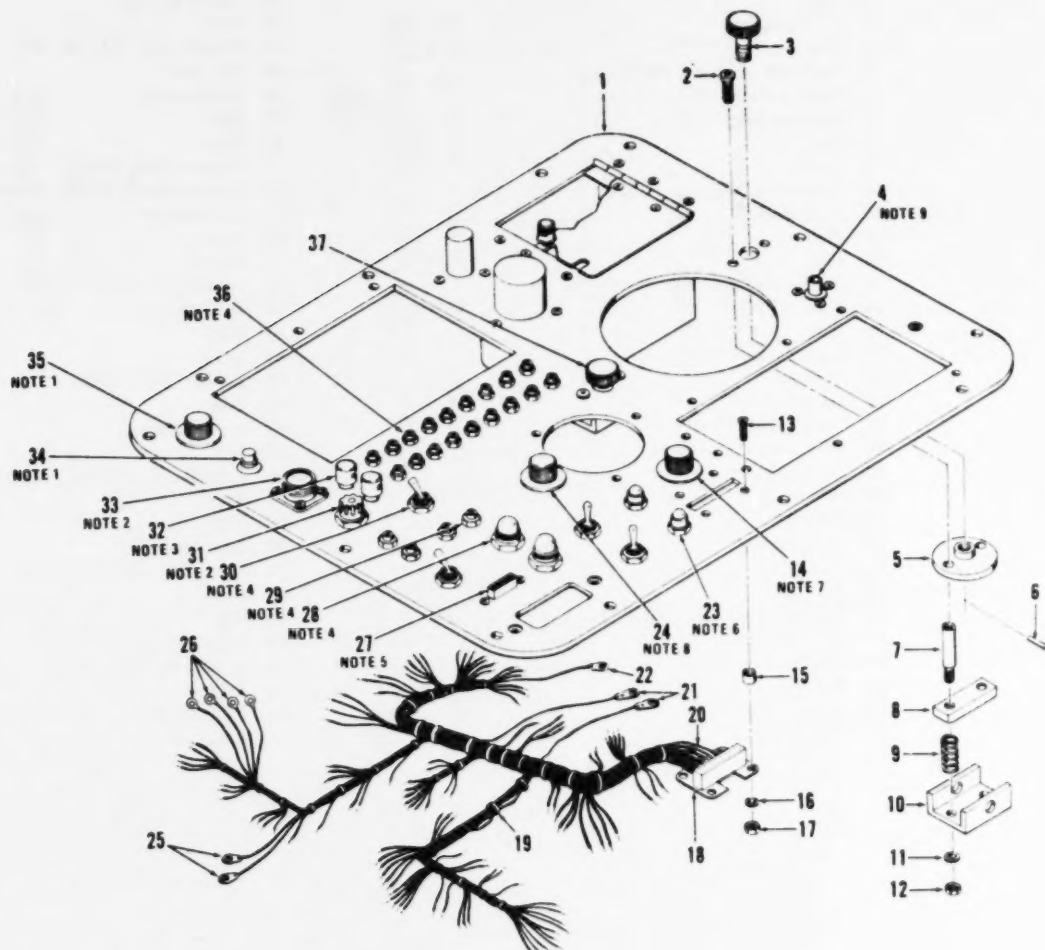
(1) Remove the panel assembly (1, fig. 6-6) from the case (para 6-6).

(2) Remove elbow connector (7, fig. 6-5) from the bottom of the adapter (67, fig. 6-7) (para 6-12f).

(3) Unscrew and remove three screws (65) and lockwashers (66) securing the adapter (67) to the panel assembly.

Key to figure 6-6.

- 1 Panel assembly
- 2 Screw
- 3 Thumbscrew
- 4 Adapter
- 5 Plate nut
- 6 Spring pin
- 7 Stud
- 8 Bar
- 9 Spring
- 10 Guide
- 11 Lockwasher
- 12 Nut
- 13 Screw
- 14 ZERO ADJUST control
- 15 Spacer
- 16 Lockwasher
- 17 Nut
- 18 1A2A4 TEST SOCKET
- 19 Strap
- 20 Branched wiring harness
- 21 Terminal lug
- 22 Terminal lug
- 23 HORN CIRCUIT indicator
- 24 METER SELECTOR switch
- 25 Terminal lugs
- 26 Terminal lugs
- 27 ALARM CARD TEST SOCKET connector
- 28 ALARM 1 indicator
- 29 OSC tip jack
- 30 AMMETER switch
- 31 2 AMP fuse assembly
- 32 + POWER binding post
- 33 POWER connector
- 34 CUT OFF TEST switch
- 35 VOLTAGE ADJUST control
- 36 Tip jack J
- 37 FLOW ADJUST valve



- NOTES: 1. SEE DETAIL A, FIG. 6-7
 2. SEE DETAIL B, FIG. 6-7
 3. SEE DETAIL C, FIG. 6-7
 4. SEE DETAIL D, FIG. 6-7
 5. SEE DETAIL E, FIG. 6-7
 6. SEE DETAIL F, FIG. 6-7
 7. SEE DETAIL G, FIG. 6-7
 8. SEE DETAIL H, FIG. 6-7
 9. SEE DETAIL I, FIG. 6-7

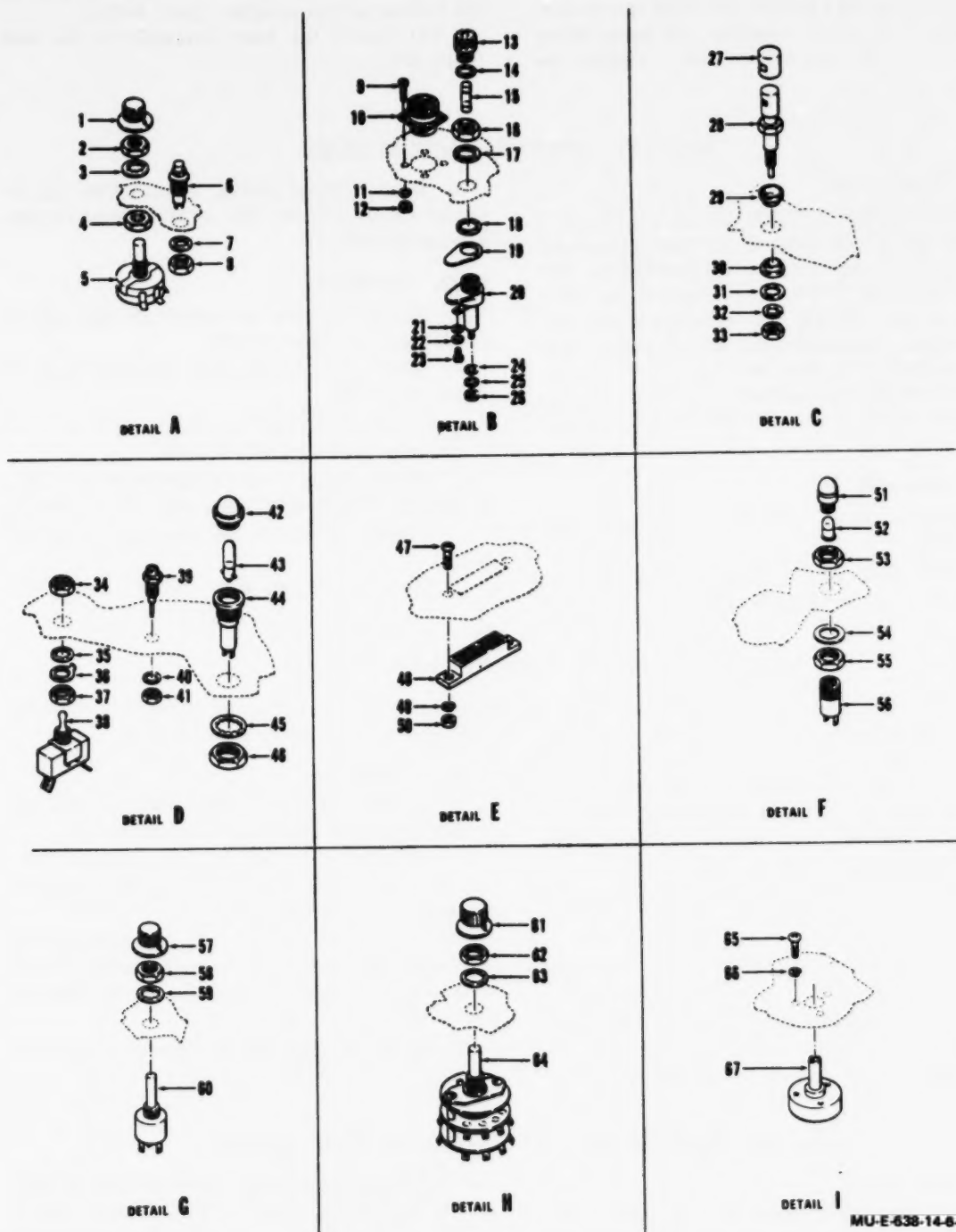
MU-E-638-14-6-6

Figure 6-6. Panel assembly, exploded view.

Key to figure 6-7.

- 1 Knob
- 2 Nut
- 3 Lockwasher
- 4 Nut
- 5 Variable resistor (R11)
- 6 Push switch (S5)
- 7 Lockwasher
- 8 Nut
- 9 Screw
- 10 Connector (J2)
- 11 Lockwasher
- 12 Nut
- 13 Cap
- 14 Preformed packing
- 15 Fuse (F1)
- 16 Nut
- 17 Lockwasher
- 18 Washer
- 19 Gasket
- 20 Fuseholder (XF1)
- 21 Washer
- 22 Lockwasher
- 23 Screw
- 24 Washer
- 25 Lockwasher
- 26 Nut
- 27 Cap
- 28 Binding post (E1, E2)
- 29 Insulator
- 30 Insulator
- 31 Washer
- 32 Lockwasher
- 33 Nut

- 34 Nut
- 35 Lockwasher
- 36 Locking ring
- 37 Nut
- 38 Switch (S2, S3, S4, S6)
- 39 Tip jack
- 40 Lockwasher
- 41 Nut
- 42 Lens
- 43 Lamp (DS3, DS4)
- 44 Lampholder (XDS3, XDS4)
- 45 Lockwasher
- 46 Nut
- 47 Screw
- 48 Connector (J4)
- 49 Lockwasher
- 50 Nut
- 51 Lens
- 52 Lamp (DS1, DS2)
- 53 Nut
- 54 Lockwasher
- 55 Nut
- 56 Lampholder (XDS1, XDS2)
- 57 Knob
- 58 Nut
- 59 Lockwasher
- 60 Variable resistor (R10)
- 61 Knob
- 62 Nut
- 63 Lockwasher
- 64 Rotary switch (S1)
- 65 Screw
- 66 Lockwasher
- 67 Adapter



MU-E-638-14-6-7

Figure 6-7. Panel details, exploded view.

b. Installation

(1) Align the adapter (67) with the mounting holes in the panel assembly and install three lockwashers (66) and screws (65). Tighten the screws.

(2) Install elbow connector (7, fig. 6-5) to the bottom of the adapter (para 6-13c).

(3) Install the panel assembly in the case (para 6-7).

Section VI. PRESSURE-VACUUM GAGE

6-18. Description

The PRESSURE-VACUUM GAGE (6, fig. 2-1) is a pneumatic measuring device that is sensitive to positive and negative changes in pressure. The gage is attached to the panel assembly by three locking clamps (38, fig. 6-8) attached to the rear of the gage. Connection to the pneumatic tubing is provided by two tee connectors (8, fig. 6-5). Direct support maintenance personnel are authorized to replace the PRESSURE-VACUUM GAGE.

6-19. Removal

a. Remove panel assembly from the case (para 6-6).

b. Disconnect two tee connectors (8, fig. 6-5) on bottom of gage (para 6-12e).

c. Remove three locking clamps (38, fig. 6-8) and screws (36 and 37) securing gage to panel assembly (1).

6-20. Installation

a. Connect two tee connectors (8, fig. 6-5) to bottom of gage (para 6-13b).

b. Insert gage (8, fig. 6-8) through front of panel assembly.

c. Attach three locking clamps (38) to rear of gage by installing screws (36).

d. Install and alternately tighten screws (37) in locking clamps (38) until gage (8) is secure.

e. Connect tubing to tee connectors (para 6-13g).

f. Install panel assembly in case (para 6-7).

Section VII. AMMETER (M1)

6-21. Description

The ammeter (M1) (9, fig. 2-1) is a 100-microampere meter that monitors circuits selected by METER SELECTOR switch (13). The ammeter is connected to the panel assembly by three screws (7, fig. 6-8), lockwashers (39), and nuts (40). Direct support maintenance personnel are authorized to replace the ammeter (M1).

6-22. Removal

a. Remove panel assembly from the case (para 6-6).

b. Remove terminal lugs (21, fig. 6-6) from ammeter terminals.

c. Unscrew and remove three screws (7, fig.

6-8), lockwashers (39), and nuts (40) securing ammeter (6) to panel assembly (1).

6-23. Installation

a. Insert ammeter (6, fig. 6-8) in panel assembly (1) with mounting holes aligned.

b. Install three screws (7), lockwashers (39), and nuts (40) to secure ammeter to panel assembly and tighten screws.

c. Connect terminal lug (21, fig. 6-6) on wire numbered 68 to positive ammeter terminal and terminal lug on wire numbered 69 to negative meter terminal.

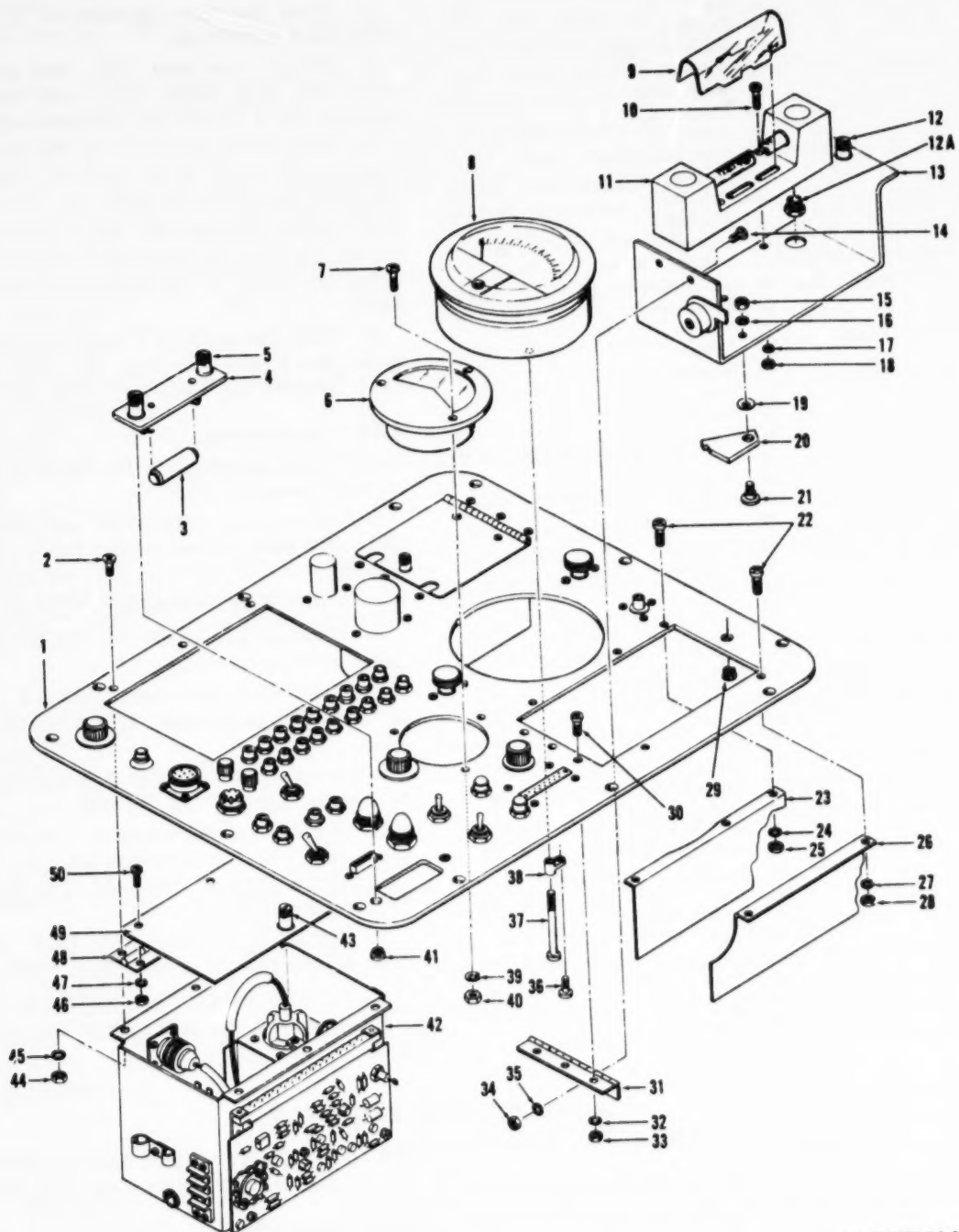
d. Replace panel assembly in case (para 6-7).

Section VIII. FLOW ADJUST AND PRESSURE LOCK VALVES

6-24. Description

The FLOW ADJUST valve (4, fig. 2-1) and PRESSURE LOCK valve (5) are manually adjustable, pneumatic flow-restricting devices. Di-

rect support maintenance personnel are authorized to replace the FLOW ADJUST and PRESSURE LOCK valves. The following procedures are applicable to both valves.



MU-E-638-14-6-8

Figure 6-8. Panel assembly, exploded view.

Key to figure 6-8.

- 1 Panel assembly
- 2 Screw
- 3 Battery (BT1)
- 4 Door
- 5 Fastener
- 6 Ammeter (M1)
- 7 Screw
- 8 Gage (M2)
- 9 Cover
- 10 Screw
- 11 Flow rate meter
- 12 Fastener
- 12A Bushing
- 13 Bracket
- 14 Screw
- 15 Nut
- 16 Lockwasher
- 17 Lockwasher
- 18 Nut
- 19 Washer
- 20 Bracket
- 21 Shaft
- 22 Screws
- 23 Bracket
- 24 Lockwasher
- 25 Nut
- 26 Bracket
- 27 Lockwasher
- 28 Nut
- 29 Self-locking nut
- 30 Screw
- 31 Hinge
- 32 Lockwasher
- 33 Nut
- 34 Nut
- 35 Lockwasher
- 36 Screw
- 37 Screw
- 38 Clamp
- 39 Lockwasher
- 40 Nut
- 41 Self-locking nut
- 42 Housing assembly
- 43 Fastener
- 44 Nut
- 45 Lockwasher
- 46 Nut
- 47 Lockwasher
- 48 Hinge
- 49 Door
- 50 Screw

6-25. Removal

- a. Remove panel assembly from the case (para 6-6).
- b. Turn the valve thumbscrew (3, fig. 6-6) fully counterclockwise.
- c. Remove two nuts (12), two lockwashers (11), the tube guide (10), two compression springs (9), and the tube compressing bar (8).
- d. Disconnect one end of the tubing and disassemble (para 6-12c and d), and pull it through the tube guide (10).
- e. Turn thumbscrew (3) clockwise until spring pin (6) is accessible. Remove the pin from the shaft of the knob, and remove the knob.
- f. Hold the studs (7), and unscrew and remove two screws (2) from the panel assembly (1). Remove the studs and plate nut (5).

6-26. Installation

- a. Insert thumbscrew (3, fig. 6-6) into hole in panel assembly (1).
- b. Screw knob into plate nut (5), keeping plate nut holes aligned with holes in panel assembly.
- c. Insert two screws (2) in panel assembly.
- d. Position two studs (7) under plate nut, and tighten screws (2).
- e. Turn knob until hole for spring pin (6) is accessible; then, insert spring pin in shaft of knob.
- f. Insert tubing through tube guide (10) and reassemble (para 6-13d through g).
- g. With the panel assembly (1) face down, place the tube compressing bar (8), the two compression springs (9), and the tube guide (10) on the studs (7).
- h. Install two lockwashers (11) and nuts (12) on the bottom of the guide posts.
- i. Turn the knob counterclockwise.
- j. Replace panel assembly in the case (para 6-7).

Section IX. FLOW RATE METER

6-27. Description

The flow rate meter (8, fig. 2-1) is a pneumatic flow-measuring device that is connected to the pneumatic system by two adapter bushings and two elbow connectors. It is attached to bracket by two screws, lockwashers,

and nuts. Direct support maintenance personnel are authorized to replace the flow rate meter.

6-28. Removal

- a. Remove panel assembly from the case (para 6-6).

b. Release knurled fastener (12, fig. 6-8) securing bracket (13), and raise bracket to the vertical position.

c. Rotate bracket (20) to maintain vertical position.

d. Disconnect tubing (para 6-12b) and remove elbow connectors (para 6-12f).

e. Remove cover (9) by pinching sides and pulling forward.

f. Remove two screws (10), lockwashers (17), and nuts (18) securing flow rate meter (11) to bracket (13).

g. Remove two adapter bushings (12A) from flow rate meter (11).

6-29. Installation

a. Install adapter bushings (12A, fig. 6-8) in flow rate meter (11).

b. Remove cover (9) from new flow rate meter by pinching its sides and pulling forward.

c. Position flow rate meter (11) in bracket (13), and insert screws (10) through holes in flow rate meter and bracket.

d. Install lockwashers (17) and nuts (18) and tighten.

e. Install cover (9).

f. Install two male elbow connectors (para 6-13c) and connect tubing (para 6-13g) to bottom of flowmeter.

g. Release bracket (20) and lower bracket (13) to horizontal position. Tighten fastener (12) securing bracket (13) to panel assembly (1).

h. Replace panel assembly in case (para 6-7).

Section X. FLOW RATE METER BRACKET

6-30. Description

The flow rate meter bracket is hinged and contains a port for attaching the M43 detector flow rate meter. Direct support maintenance personnel are authorized to replace or repair the bracket.

6-31. Removal

a. Remove panel assembly from the case (para 6-6).

b. Remove flow rate meter (para 6-28).

c. Remove two screws (14, fig. 6-8), lockwashers (35), and nuts (34) securing hinge (31) to bracket (13).

d. Remove bracket (13) from panel assembly (1).

e. Remove shaft (21), washer (19), lockwasher (16), bracket (20), and nut (15).

f. If necessary, remove four screws (22), lockwashers (24 and 27), and nuts (25 and 28) securing angle brackets (23 and 26) to bottom of panel assembly (1).

6-32. Repair

Repair of the bracket is limited to replacement of the angle brackets (23 and 26, fig. 6-8) and the self-locking nut (29).

6-33. Installation

a. If removed, install brackets (23 and 26, fig. 6-8) to bottom of panel assembly (1), using four screws (22), lockwashers (24 and 27) and nuts (25 and 28).

b. Install bracket (20) and washer (19) on shaft (21) and insert into bracket (13).

c. Install lockwasher (16) and nut (15) on shaft (21) and tighten.

d. Assemble the flow rate meter onto the bracket (para 6-29).

e. Position the bracket (13) on the front panel assembly (1), and attach two screws (14), lockwashers (35), and nuts (34) to secure bracket (13) to the hinge (31).

f. Install panel assembly in the case (para 6-7).

Section XI. TUBING STORAGE ENCLOSURE

6-34. Description

The tubing storage enclosure provides storage for the PRESSURE TEST tubing and the VACUUM TEST tubing when not in use. Direct support maintenance personnel are authorized to replace the tubing storage enclosure.

6-35. Removal

a. Remove the panel assembly from the case (para 6-6).

b. Turn the panel assembly (6, fig. 6-4) on its side. Release fastener (11), open access door (12), and remove tubing.

c. Remove two nuts (18), lockwashers (17), screws (16), and access door (12) from hinge (22).

d. Remove six nuts (20), screws (1), and lockwashers (21) that attach the enclosure (19), hinge (22), and screws (1).

e. Remove screws (14), lockwashers (13), and latch bracket (15) from enclosure (19).

6-36. Installation

a. Position latch bracket (15, fig. 6-4) in enclosure (19), place lockwashers (13) on screws (14), and install screws through latch bracket.

b. Position hinge (22) and enclosure under mounting holes in panel assembly (6), and insert six screws (1) through mounting holes.

c. Install lockwashers (21) and nuts (20) on the screws (1) and tighten.

d. Position access door (12) on hinge (22), and install and tighten screws (16), lockwashers (17), and nuts (18).

e. Install tubing in enclosure, and close and fasten access door.

f. Install panel assembly in the case (para 6-7).

Section XII. BATTERY COVER ASSEMBLY

6-37. Description

The battery cover assembly provides mounting and connection for battery (BT1). Direct support maintenance personnel are authorized to replace the battery cover assembly.

6-38. Removal

a. Release the two fasteners (5, fig. 6-8) attaching the door (4) to the panel assembly (1).

b. Remove battery (3) from the clips of the door (4).

c. Tag and unsolder two wires from the clips.

d. Remove the cover.

6-39. Installation

a. Position the door (4, fig. 6-8) near its mounting hole.

b. Attach and solder the two tagged wires to the proper clips of the cover.

CAUTION

Insure battery polarity is correct to avoid damage to ammeter (M1) and associated circuits.

c. Install battery (3) between the clips of battery door (4).

d. Insert door (4) in panel assembly (1), and tighten the fasteners (5).

Section XIII. POWER CONNECTOR

6-40. Description

Operating power is supplied to the M74 test set through a bayonet-type POWER connector (29, fig. 2-1). Direct support maintenance personnel are authorized to replace the POWER connector.

6-41. Removal

a. Remove the panel assembly from the case (para 6-6).

b. Pull sleeves away from soldered connections of the POWER connector (33, fig. 6-6).

c. Tag and unsolder wires from pin connections.

d. Remove screws (9, fig. 6-7), lockwashers (11), and nuts (12).

e. Remove connector (10) through front of panel assembly.

6-42. Installation

a. Install sleeves on wires.

b. Position connector (10, fig. 6-7) on panel assembly so that broad key-slot is at the top.

c. Insert screws (9) through panel and connector; install lockwashers (11) and nuts (12) on screws (9) and tighten screws.

d. Solder wires to pin connections (fig. 6-2).

e. Slide sleeves over soldered connections.

f. Replace panel assembly in the case (para 6-7).

Section XIV. ALARM CARD TEST SOCKET

6-43. Description

The M42 alarm circuit card plugs into ALARM CARD TEST SOCKET (21, fig. 2-1) for testing. Direct support maintenance personnel are authorized to replace the ALARM CARD TEST SOCKET.

6-44. Removal

- a. Remove the panel assembly from the case (para 6-6).
- b. Pull insulation sleeves away from soldered pin connections of connector (27, fig. 6-6).
- c. Tag and unsolder wires from pin connections.
- d. Remove screws (47, fig. 6-7), lockwashers (49), and nuts (50).

- e. Remove connector (48) through rear of panel assembly.

6-45. Installation

- a. Install insulation sleeves on wires.
- b. Position connector (27, fig. 6-6) on panel assembly.
- c. Insert screws (47, fig. 6-7) through panel assembly and connector (48), install lockwashers (49) and nuts (50) on screws (47), and tighten screws.
- d. Solder wires to pin connections (fig. 6-2).
- e. Slide insulation sleeves over soldered connections.
- f. Install panel assembly in the case (para 6-7).

Section XV. SWITCHES, VARIABLE RESISTORS, FUSEHOLDER, LAMP HOLDERS, BINDING POSTS, AND TIP JACKS

6-46. Description

The switches, variable resistors, fuseholder, lampholders, binding posts, and tip jacks provide control and monitoring of the electronic and electrical circuits of the M74 test set and the unit under test. Direct support maintenance personnel are authorized to replace switches, variable resistors, the fuseholder, lampholders, binding posts, and tip jacks.

6-47. Switches

a. *Toggle Switches.* The following procedure for the removal and installation of AMMETER switch (30, fig. 6-6) is typical.

(1) Removal.

- (a) Remove panel assembly from the case (para 6-6).
- (b) Tag and unsolder wires, or remove terminal lug connections from bottom of switch (38, fig. 6-7).
- (c) Remove nut (34) securing switch to panel assembly.
- (d) Remove switch from bottom of panel assembly.

(2) Installation.

- (a) Remove nut (34) from replacement switch (38).
- (b) Insure that lockwasher (35), locking ring (36), and nut (37) are on the replacement switch.
- (c) Position switch through panel assembly from the bottom, with locking

ring (36), lockwasher (35), and nut (37) mounted on the switch.

(d) Adjust nut (37) until the switch threads that extend above the top of the panel assembly are the same thickness as nut (34). Verify that switch is positioned properly before proceeding.

(e) Install and tighten nut (34).

(f) Attach and solder wires, or re-connect terminal lugs to switch terminals (fig. 6-2).

(g) Replace panel assembly in the case (para 6-7).

b. *CUT OFF TEST Switch* (34, fig. 6-6).

(1) Removal.

- (a) Remove panel assembly from the case (para 6-6).
- (b) Tag and unsolder wires from bottom of push switch (6, fig. 6-7).
- (c) Remove nut (8) and lockwasher (7) securing push switch (6) to panel assembly.

(2) Installation.

- (a) Remove nut (8) and lockwasher (7) from replacement push switch (6).
- (b) Position switch in place on panel assembly from the top.
- (c) Install lockwasher (7) and nut (8).
- (d) Attach and solder wires to switch terminals (fig. 6-2).
- (e) Replace panel assembly in the case (para 6-7).

6-48. Variable Resistors

a. VOLTAGE ADJUST Control (35, fig. 6-6).

(1) Removal.

(a) Remove panel assembly from the case (para 6-6).

(b) Tag and unsolder wires from bottom of variable resistor (5, fig. 6-7).

(c) Remove knob (1) (para 4-6b).

(d) Remove nut (2) and lockwasher (3) securing variable resistor (5) to panel assembly.

(2) Installation.

(a) Remove nut (2) and lockwasher (3) from replacement variable resistor (5).

(b) Insure that nut (4) is on the replacement variable resistor.

(c) Position variable resistor in place on panel assembly from the bottom.

(d) Adjust nut (4) until the threads of the variable resistor that extend above the top of the panel assembly are the same thickness as nut (2). Verify that the variable resistor is positioned properly before proceeding.

(e) Install lockwasher (3) and nut (2). Tighten nut.

(f) Replace knob (1) (para 4-6c).

(g) Attach and solder wires to the variable resistor terminals (fig. 6-2).

(h) Replace panel assembly in the case (para 6-7).

b. ZERO ADJUST Control (14, fig. 6-6).

(1) Removal.

(a) Remove panel assembly from the case (para 6-6).

(b) Tag and unsolder wires from bottom of variable resistor (60, fig. 6-7).

(c) Remove knob (57) (para 4-6b).

(d) Remove nut (58) and lockwasher (59) securing variable resistor (60) to panel assembly.

(2) Installation.

(a) Remove nut (58) and lockwasher (59) from replacement variable resistor (60).

(b) Position variable resistor (60) through panel assembly from bottom.

(c) Install lockwasher (59) and nut (58); tighten nut.

(d) Replace knob (57) (para 4-6c).

(e) Attach and solder wires to resistor terminals (fig. 6-2).

(d) Replace knob (57) (para 4-6c). (para 6-7).

6-49. 2-AMP Fuse Assembly

a. Removal.

(1) Remove panel assembly from the case (para 6-6).

(2) Remove nut (26, fig. 6-7), lockwasher (25), washer (24), screw (23), lockwasher (22), and washer (21).

(3) Remove terminal lugs (25, fig. 6-6) from bottom of fuseholder (20, fig. 6-7).

(4) Remove cap (13), fuse (15), preformed packing (14), nut (16), and lockwasher (17) securing fuseholder (20) to panel assembly.

b. Installation.

(1) Remove nut (16) and lockwasher (17) from replacement fuseholder (20).

(2) Insure that nut (26), screw (23), flat washers (21 and 24), lockwashers (22 and 25), gasket (19), and washer (18) are on the replacement fuseholder (20).

(3) Position fuseholder (20) in panel assembly from the bottom.

(4) Install lockwasher (17) and nut (16); tighten nut.

(5) Replace preformed packing (14), fuse (15), and cap (13) on fuseholder.

(6) Using figure 6-2 as a guide, attach terminal lugs (25, fig. 6-6) to bottom of fuseholder (20, fig. 6-7) using nut (26), screw (23), lockwashers (22 and 25), and washers (21 and 24).

(7) Install panel assembly in the case (para 6-7).

6-50. Lampholders

a. Indicator Light Assembly (XDS3) and (XDS4). The following procedure for the removal and installation of ALARM 1 indicator (XDS4) (18, fig. 2-1) also applies for the ALARM 2 indicator (XDS3) (19).

(1) Removal.

(a) Remove panel assembly from the case (para 6-6).

(b) Tag and unsolder wires from bottom of lampholder (44, fig. 6-7).

(c) Remove lens (42) and lamp (43) from lampholder (44).

(d) Remove nut (46) and lockwashers (45).

(2) Installation.

(a) Remove nut (46) and lockwasher (45) from replacement indicator lampholder (44).

(b) Position lampholder in panel assembly from the top.

(c) Install lockwasher (45) and nut (46); tighten nut.

(d) Attach and solder wires to lampholder terminals (fig. 6-2).

(e) Install lamp (43) and lens (42).

(f) Replace panel assembly in the case (para 6-7).

b. *Indicator Light Assembly.* (XDS1) and (XDS2). The following procedure for the removal and installation of HORN CIRCUIT indicator (XDS2) (15, fig. 2-1) also applies to the REMOTE CIRCUIT indicator (XDS1) (14).

(1) *Removal.*

(a) Remove panel assembly from the case (para 6-6).

(b) Tag and unsolder wires from lampholder (56, fig. 6-7).

(c) Remove lens (51), lamp (52), and nut (53).

(2) *Installation.*

(a) Remove the nut (53) from the replacement lampholder (56).

(b) Insure that lockwasher (54) and nut (55) are on the replacement lampholder (56).

(c) Position lampholder (56) in panel assembly from the bottom.

(d) Adjust nut (55) until lampholder threads that extend above the top of the panel assembly are the same thickness as nut (53).

(e) Install and tighten nut (53).

(f) Attach and solder wires to lampholder terminals (fig. 6-2).

(g) Install lamp (52, fig. 6-7) and lens (51).

(h) Replace panel assembly in the case (para 6-7).

6-51. Tip Jacks

a. *OSC, GRD, and CURRENT MEASURE Tip Jacks; TP19, TP20, TP21, and TP22.* The following procedure for the removal and installation of OSC tip jack (20, fig. 2-1) is applicable for the GRD or CURRENT MEASURE tip jacks.

(1) *Removal.*

(a) Remove panel assembly from the case (para 6-6).

(b) Tag and unsolder wire from bottom of tip jack (39, fig. 6-7).

(c) Remove mounting hex nut (41) and lockwasher (40) from bottom of tip jack (39) and remove jack.

(2) *Installation.*

(a) Remove nut (41) and lockwasher (40) from replacement tip jack (39).

(b) Position tip jack in panel assembly from the top.

(c) Install lockwasher (40) and nut (41) on tip jack (39).

(d) Attach and solder wire to tip jack terminal (fig. 6-2).

(e) Replace panel assembly in the case (para 6-7).

b. *A through L, N through W, and AMP Tip Jacks; TP1 through TP18.*

(1) *Removal.*

(a) Remove panel assembly from the case (para 6-6).

NOTE

If A through L tip jacks (TP1 through TP9) are to be replaced, perform (b) through (e) below. If N through W or AMP tip jacks (TP10 through TP18) are to be replaced, proceed to (c) below.

(b) Using care to avoid damage to leads, move branched wiring harness (20, fig. 6-6) clear of tip jack to be replaced.

(c) Tag and unsolder wire from terminal of tip jack to be replaced.

(d) Hold body of tip jack (39, fig. 6-7), and unscrew and remove nut (41) and lockwasher (40).

(2) *Installation.*

(a) Remove nut (41) and lockwasher (40) from replacement tip jack (39).

(b) Position tip jack in panel assembly from the top.

(c) Install lockwasher (40) and nut (41) on tip jack (39); tighten nut.

(d) Attach and solder wire to tip jack terminal (fig. 6-2).

(e) Replace panel assembly in the case (para 6-7).

6-52. Binding Posts

The following procedure for the removal and installation of the + POWER binding post (28, fig. 2-1) also applies to the - POWER binding post.

a. *Removal.*

(1) Remove panel assembly from the case (para 6-6).

(2) Tag and unsolder wires from bottom of binding post (28, fig. 6-7).

(3) Remove nut (33), lockwasher (32), washer (31), and insulator (30) from bottom of binding post (28).

(4) Remove body of binding post from top of panel assembly.

(5) Remove insulator (29) from panel assembly.

b. Installation.

(1) Remove mounting hardware from replacement binding post.

(2) Install body of binding post (28) with

cap (27) and insulator (29) attached through the top of the panel assembly.

(3) Install insulator (30), washer (31), lockwasher (32), and nut (33) on body of binding post (28) from the bottom of the panel assembly; tighten nut.

(4) Solder wires to bottom of binding post (fig. 6-2).

(5) Replace panel assembly in the case (para 6-7).

Section XVI. CIRCUIT CARD ASSEMBLY

6-53. Description

The electronic components (resistors, capacitors, and transistors) of the M74 test set are mounted on a circuit card. Direct support maintenance personnel are authorized to replace a defective circuit card assembly.

6-54. Removal

a. Remove the panel assembly from the case (para 6-6).

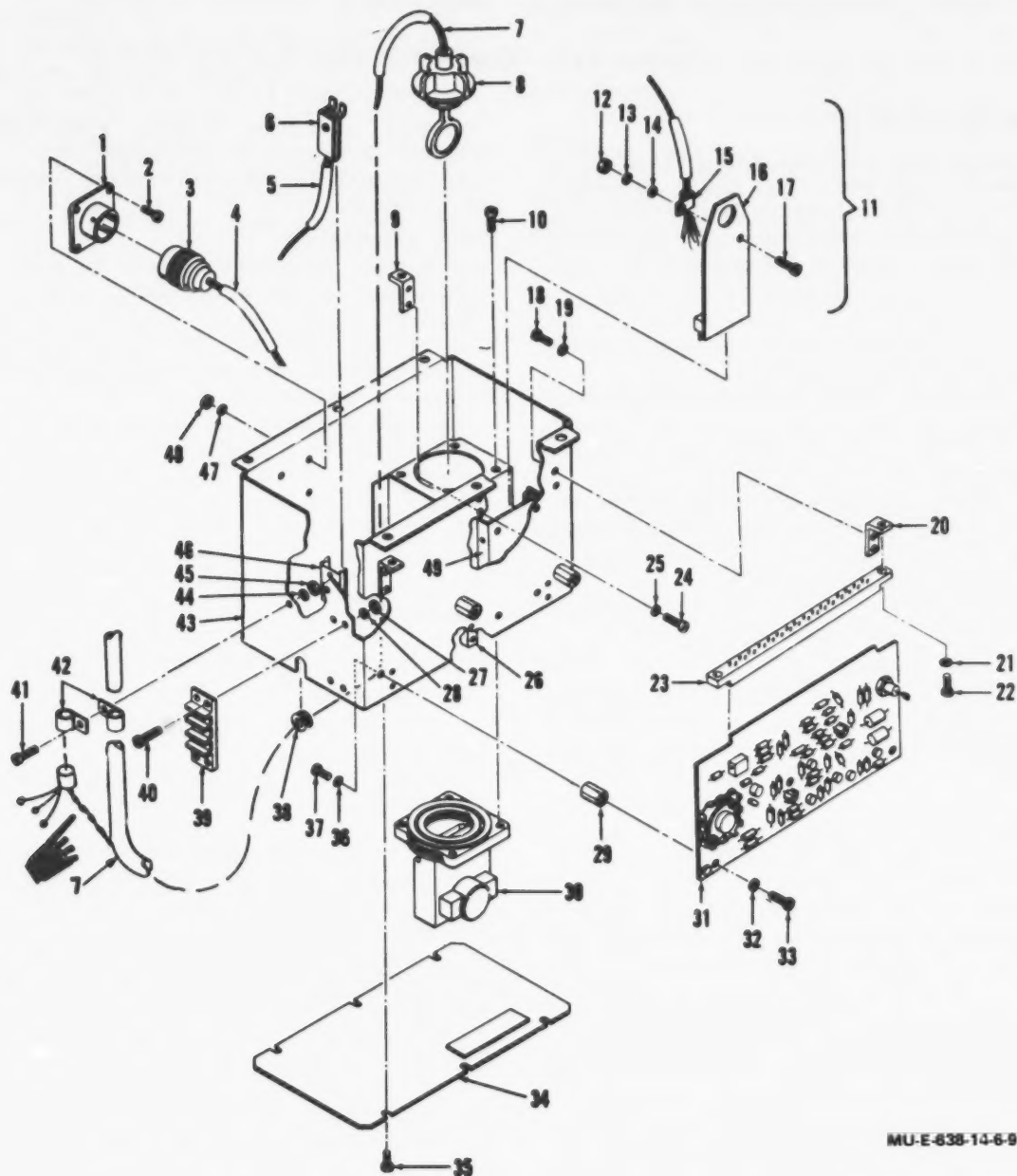
b. Remove three screws (33, fig. 6-9) and lockwashers (32) connecting the circuit card assembly (31) to posts (29).

c. Pull the circuit card assembly away from connector (J6) (23).

Key to figure 6-9.

- 1 Dummy connector
- 2 Screw
- 3 Connector (P2)
- 4 DETECTOR POWER cable
- 5 PUMP POWER cable
- 6 Connector (J3)
- 7 INLET TEMP. cable
- 8 Paddle assembly (P3)
- 9 Latch bracket
- 10 Screw
- 11 CHASSIS TEST cable
- 12 Nut
- 13 Lockwasher
- 14 Washer
- 15 Clamp
- 16 Connector (P1)
- 17 Screw
- 18 Screw
- 19 Lockwasher
- 20 Bracket
- 21 Lockwasher
- 22 Screw
- 23 Connector (J6)
- 24 Screw

- 25 Lockwasher
- 26 Nut
- 27 Nut
- 28 Lockwasher
- 29 Post
- 30 Housing
- 31 Circuit card assembly
- 32 Lockwasher
- 33 Screw
- 34 Cover
- 35 Screw
- 36 Lockwasher
- 37 Screw
- 38 Grommet
- 39 Terminal board (TB1)
- 40 Screw
- 41 Screw
- 42 Clamps
- 43 Housing
- 44 Lockwasher
- 45 Nut
- 46 Clip
- 47 Lockwasher
- 48 Nut
- 49 Bracket



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Figure 6-9. Cable storage housing and electronic components assembly, exploded view.

6-55. Installation

- a. Insert the circuit card assembly (31, fig. 6-9) into connector (J6) (23).
- b. Install lockwashers (32) on screws

(33), insert screws through circuit card assembly, and screw into posts (29).

- c. Replace panel assembly in the case (para 6-7).

Section XVII. CONNECTOR (J6)

6-56. Description

The connector (J6) (23, fig. 6-9) provides connection between the panel assembly circuits and the circuit card assembly (31). Direct support maintenance personnel are authorized to replace connector (J6).

6-57. Removal

- a. Remove the panel assembly from the case (para 6-6).
- b. Remove circuit card assembly (para 6-54).
- c. Remove screws (22, fig. 6-9) and lockwashers (21).
- d. Bend connector (23) away from housing (43) to provide access to the connector terminals.

- e. Pull insulation sleeves away from soldered terminals of connector (23).

- f. Tag and unsolder wires from connector terminals.

6-58. Installation

- a. Install insulation sleeves on wires.
- b. Solder wires to connector terminals (fig. 6-2).
- c. Secure connector (23, fig. 6-9) to connector brackets (20) using two screws (22) and lockwashers (21).
- d. Slide insulation sleeves over soldered connections of connector (23).
- e. Replace circuit card assembly (para 6-55).
- f. Replace panel assembly in the case (para 6-7).

Section XVIII. CABLES

6-59. Description

The INLET TEMP cable (37, fig. 2-1) and DETECTOR POWER cable (35) provide connection between the M74 test set and the M43 detector for the application of test signals and the monitoring of outputs. The PUMP POWER cable (34) provides power to the M43 detector pump unit during tests. The cables are mounted in the CABLE STORAGE compartment. Direct support maintenance personnel are authorized to repair or replace the cables.

6-60. Preliminary

- a. Remove the panel assembly from the case (para 6-6).
- b. Place panel assembly, front downward, on a clean work surface.
- c. Remove cover (34, fig. 6-9) by unscrewing six screws (35).
- d. Remove screw (41), lockwasher (44), nut (45), and clamps (42) that secure the cables to side of housing (43).
- e. Remove the split grommet (38) from the housing (43) and from the cables.

6-61. INLET TEMP Cable

a. Removal.

- (1) Perform preliminary procedures (para 6-60).
- (2) Tag and disconnect INLET TEMP cable leads from terminal board (TB1) (39, fig. 6-9).
- (3) Rotate paddle assembly (8) counterclockwise and remove it from housing (30).

b. Installation.

- (1) Install paddle assembly (8) in housing (30) and secure by rotating paddle assembly (8) clockwise.
- (2) Connect INLET TEMP cable leads to terminal board (TB1) (39).
- (3) Place potted resistor R28 in clamp (42) and secure both clamps (42) to housing (43) with screw (41), lockwasher (44), and nut (45).
- (4) Install split grommet (38) around cable and slide the grommet into groove in housing (43).
- (5) Secure cover (34) with six screws (35).
- (6) Replace panel assembly in the case (para 6-7).

6-62. DETECTOR POWER Cable**a. Removal.**

(1) Perform preliminary procedures (para 6-60).

(2) Disconnect connector (P2) (3, fig. 6-9) from dummy connector (1).

(3) Remove circuit card assembly (para 6-54).

(4) Provide access to terminals on connector (J6) (para 5-57c and d).

(5) Tag and unsolder DETECTOR POWER cable leads from connector (J6), connector (J2), and switch (S4) (fig. 6-2).

b. Repair. Repair of the DETECTOR POWER cable is limited to the replacement or splicing of a broken or frayed wire.

c. Installation.

(1) Solder DETECTOR POWER cable lead wires to switch (S4), connector (J2), and connector (J6) (fig. 6-2).

(2) Attach connector (P2) (3, fig. 6-9) to dummy connector (1).

(3) Place cable in clamp (42) and secure both clamps (42) to housing (43) with screw (41), lockwasher (44), and nut (45).

(4) Install split grommet (38) around cable and slide the grommet into groove in housing (43).

(5) Secure cover (34) with six screws (35).

(6) Replace panel assembly in the case (para 6-7).

6-63. PUMP POWER Cable**a. Removal.**

(1) Perform preliminary procedures (para 6-60).

(2) Remove connector (J3) (6, fig. 6-9) from clip (46).

(3) Tag and unsolder PUMP POWER cable leads from variable resistor (R11), switch (S5), and switch (S4) (fig. 6-2).

b. Repair. Repair of the PUMP POWER cable is limited to the replacement or splicing of a broken or frayed wire.

c. Installation.

(1) Solder PUMP POWER cable lead wires to switch (S4), switch (S5), and variable resistor (R11).

(2) Secure connector (J3) in clip (46, fig. 6-9).

(3) Place cable in clamp (42) and secure both clamps (42) to housing (43) with screws (41), lockwasher (44), and nut (45).

(4) Install split grommet (38) around cable and slide grommet into groove in housing (43).

(5) Secure cover (34) with six screws (35).

(6) Replace panel assembly in the case (para 6-7).

Section XIX. HOUSING ASSEMBLY**6-64. Description**

The housing assembly (42, fig. 6-8) is mounted on the bottom of the panel assembly (1), and provides storage for the INLET TEMP cable (37, fig. 2-1), CHASSIS TEST cable (36), DETECTOR POWER cable (35), and PUMP POWER cable (34), and mounting for the circuit card assembly (31, fig. 6-9). Direct support maintenance personnel are authorized to replace the housing assembly.

6-65. Removal and Disassembly

a. Remove the panel assembly from the case (para 6-6).

b. Remove six screws (35, fig. 6-9) and cover (34) from housing (43).

c. Tag and disconnect wires from terminal board (TB1) (39).

d. Remove circuit card assembly (31) (para 6-54b and c).

e. Remove screw (41), lockwasher (44), nut (45), and clamp loops (42) that secure the cables to side of housing (43).

f. Remove the split grommet (38) from the housing (43) and from around the cables.

g. Remove connector (16) from housing (30).

h. Remove paddle assembly (8) from the housing (30) by twisting the paddle assembly 90 degrees counterclockwise and pulling upward.

i. Remove DETECTOR POWER cable connector (3) from dummy connector (1).

j. Remove PUMP POWER connector (J3) (6) from clip (46).

k. Remove two screws (22) and lockwashers (21) securing connector (J6) (23) to brackets (20).

l. Remove three screws (50, fig. 6-8), lockwashers (47), and nuts (46) that attach the door (49) to hinge (48).

m. Unscrew and remove six screws (2),

nuts (44), and lockwashers (45) that attach housing (43) to the panel assembly (1). Remove housing assembly from panel assembly (1) for further disassembly.

n. Remove two screws (24, fig. 6-9) and lockwashers (25) that attach bracket (9) to housing (43).

o. Remove four screws (2), lockwashers (47), and nuts (48) that attach the dummy connector (1) to the housing (43).

p. Remove two screws (18) and lockwashers (19) that attach each bracket (20) to the housing (43).

q. Remove four screws (10) that attach housing (30) to housing (43).

r. Remove four screws (40), nuts (27), and lockwashers (28) that secure terminal board (39) to the housing (43).

6-66. Assembly and Installation

a. Attach terminal board (39, fig. 6-9) to housing (43) using four screws (40), nuts (45), and lockwashers (44).

b. Install housing (30) in housing (43) using four screws (10).

c. Attach brackets (20) to housing (43) using two screws (18) and lockwashers (19) for each bracket.

d. Attach bracket (9) to housing (43) with two screws (24) and lockwashers (25).

e. Install dummy connector (1) in housing (43) using four screws (2), lockwashers (47), and nuts (48).

f. Attach housing assembly (42, fig. 6-8) and hinge (48) to bottom of panel assembly

(1) using six screws (2), lockwashers (45), and nuts (44).

g. Attach the door (49) to hinge (48) using three screws (50), lockwashers (47), and nuts (46).

h. Secure connector (23, fig. 6-9) to brackets (20) using two screws (22) and lockwashers (21). Handle carefully so as not to damage or break the leads connected to the connector.

i. Place the PUMP POWER cable (5) inside the housing (43). Press connector (J3) (6) into the clip (46).

j. Place the DETECTOR POWER cable (4) inside the housing (43). Attach connector (P2) (3) to dummy connector (1).

k. Secure paddle assembly (8) in the housing (30). Connect INLET TEMP cable (7) wires to terminal board (TB1) (fig. 6-2).

l. Connect terminal lugs (26, fig. 6-6) to terminal board (TB1) (39, fig. 6-9).

m. Place the CHASSIS TEST cable (11) inside the housing (43). Insert connector (16) in the bracket (49) for storage.

n. Install grommet (38) around cables and slide grommet into groove in housing (43).

o. Install clamps (42) with screws (41), lockwasher (44), and nut (45) to secure the cables to the side of the housing (43).

p. Replace cover (34) using six screws (35) and nuts (26).

q. Replace circuit card assembly (31) (para 6-55).

r. Replace the panel assembly in the case (para 6-7).

Section XX. GAGE MOUNTING PLATE

6-67. Description

The gage mounting plate provides storage for accessories under the inner lid assembly hinged to the lid of the case (fig. 1-1). Direct support maintenance personnel are authorized to repair the gage mounting plate assembly.

6-68. Removal

a. Open case and release three latch button fasteners securing hinged inner lid assembly.

b. Remove the components (fig. 1-1) from the gage mounting plate by unclipping or releasing fasteners.

c. Unscrew and remove four screws (8,

fig. 6-10) and lockwashers (9) attaching plate (1) to posts (10).

d. Remove four screws (13), lockwashers (12), and posts (10) from inner lid assembly (11).

6-69. Disassembly

a. Remove tubular rivet (3, 5, or 7, fig. 6-10) securing damaged clip (2) or spring (4) from plate (1).

b. Remove damaged stud (6) from plate (1).

6-70. Assembly

a. Insert tubular rivets (3.5, 5, or 7, fig. 6-10) through replacement clip (2) and spring (4).

b. Attach tubular rivets (3, 5, or 7) to plate (1).

c. Attach stud (6) to plate (1).

6-71. Installation

a. Place lockwashers (12, fig. 6-10) on four screws (13), insert screws through inner lid assembly (11) into posts (10), and tighten screws.

b. Position the plate (1) on posts (10).

c. Install and tighten four screws (8) and lockwashers (9) through plate (1) into posts (10).

d. Install the accessories (fig. 1-1) on the gage mounting plate by inserting in clips or attaching fasteners.

e. Close inner lid assembly and attach three latch button fasteners.

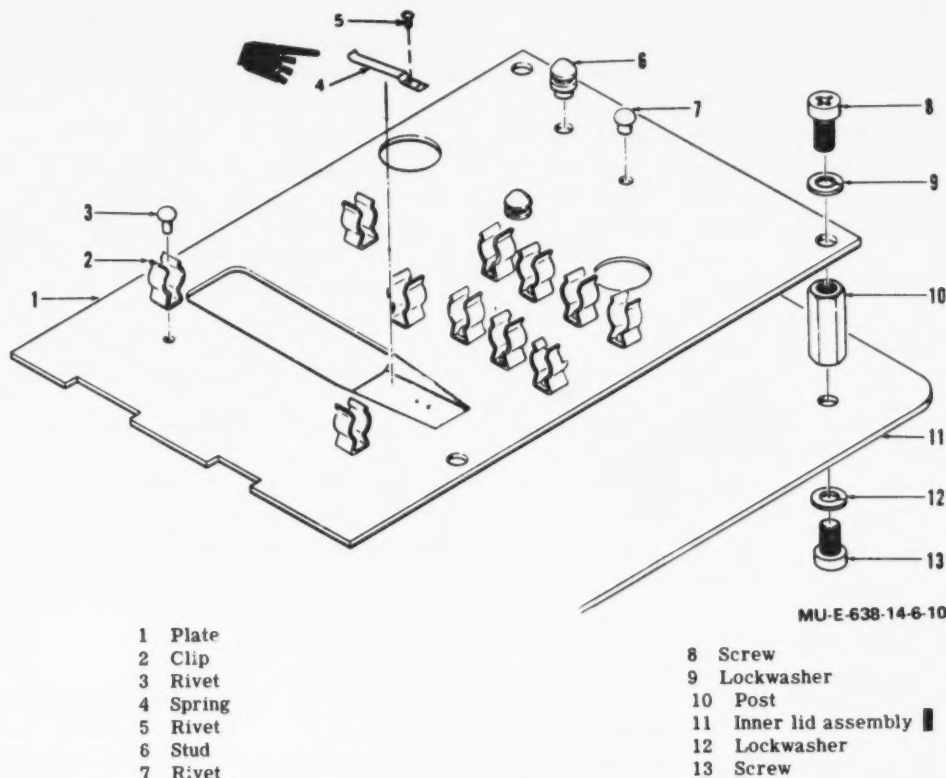


Figure 6-10. Gage mounting plate, exploded view.

Section XXI. BRANCHED WIRING HARNESS

6-72. Description

The branched wiring harness (20, fig. 6-6) is composed of a wire harness terminating in a printing board (18). General support maintenance personnel are authorized to repair the branched wiring harness.

NOTE

Solder-type terminal lugs will be used on the ends of wires numbered 58 (J6-34), 50, 106, and 110 (TB1-1), 107 and 111 (TB1-2), 108

and 112 (TB1-3), 68 (M1 pos.), 69 (M1 neg.), 57 (XF1-2), and 58 (XF1-1). M74 test sets serial numbered 1 through 77 may have crimp-type terminal lugs on wires connected to S2, S3, S4, and S6 as well. When replacing any of the authorized wires or terminals, use solder-type terminal lugs. When replacing S2, S3, S4, or S6 or wires

connected to these switches, do not use terminal lugs, but solder the wire leads directly to the switch terminals.

6-73. Repairing and Replacing Wires

a. If troubleshooting reveals a defective circuit due to a broken wire or damaged insulation, locate both ends of the wire and cut the wire from its terminations leaving approximately 1 inch on each end.

b. Run a replacement wire following the wiring harness from each of the terminations. Strip and tin each end. Solder terminal lugs to the wires, if applicable.

c. Unsolder the pieces of the defective wire and solder or attach the replacement wire ends to the terminations.

d. Using electrical tape, secure the replacement wire to the branched wiring harness (20, fig. 6-6).

e. Replace and secure the panel assembly in the case (para 6-7).

CHAPTER 7

GENERAL SUPPORT MAINTENANCE

Section I. PRINTED WIRING BOARD

7-1. Description

The 1A2A4 TEST SOCKET (18, fig. 6-6) is a connector soldered to a printed wiring board, which is connected to the branched wiring harness (20). General support maintenance personnel are authorized to replace a defective printed wiring board.

NOTE

Refer to TB SIG 222 for instructions regarding soldering techniques for printed-circuit assemblies and terminal lugs as well as for the repair of electrical circuit wires by splicing.

7-2. Removal

- a. Remove the panel assembly from the case (para 6-6).
- b. Position panel assembly on a clean surface.
- c. Remove four nuts (17, fig. 6-6), lockwashers (16), spacers (15), and screws (13) to separate 1A2A4 TEST SOCKET (18) and the printed board from the panel assembly (1).
- d. Position the assembly so that the solder

connections are accessible.

- e. Tag each wire before unsoldering from the printed wiring board for ease in reassembly.
- f. Remove each wire from the printed board.

7-3. Reassembly

- a. Place each wire through its proper hole in the printed board and solder in place.
- b. Insert a screw (13, fig. 6-6) through the front of the panel assembly (1). Place a spacer (15) over the threads on the rear of the panel assembly.
- c. Position the 1A2A4 TEST SOCKET (18) and the printed wiring board so that the screw threads pass through the proper hole in the board. Place a lockwasher (16) and nut (17) on the screw threads to loosely fasten the printed board assembly to the panel assembly.
- d. Repeat c above for the other three holes of the panel assembly and printed wiring board.
- e. Tighten each nut.
- f. Replace and secure the panel assembly in the case (para 6-7).

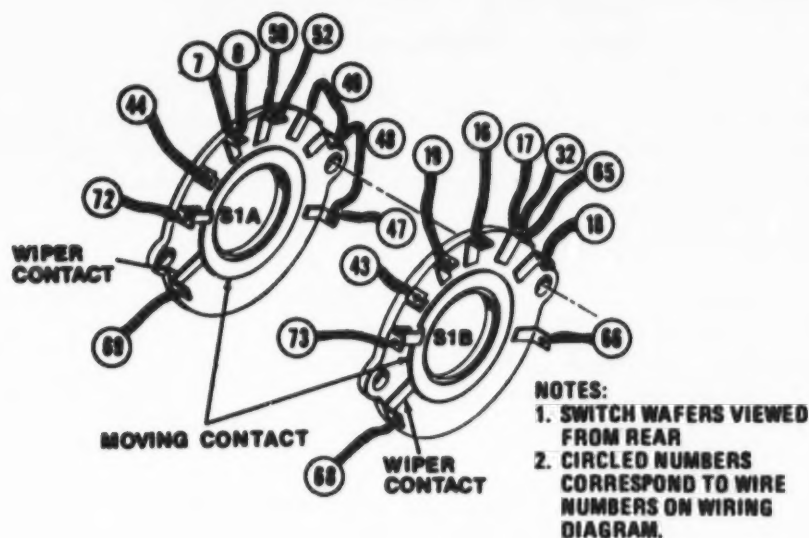
Section II. ROTARY SWITCH S1

7-4. Description

The METER SELECTOR switch (S1) (13, fig. 2-1) is a two-wafer, eight-position rotary switch that is used to select various signals from units-under-test for display on ammeter (M1) (6, fig. 6-8). General support maintenance personnel are authorized to replace a defective S1.

7-5. Removal

- a. Remove the panel assembly from the case (para 6-6).
- b. Position the panel assembly on a clean surface.
- c. Tag and label the wires to be removed from the rotary switch (S1) (64, fig. 6-7) terminals; use the number references shown in figure 7-1.



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Figure 7-1. METER SELECTOR switch S1 electrical connections.

- d. Unsolder the wires.
- e. Loosen the setscrews that secure the METER SELECTOR knob (61, fig. 6-7) to the switch shaft and remove the knob.
- f. Remove nut (62) and lockwasher (63) from shaft of switch (64) and remove switch from panel assembly.

7-6. Installation

- a. With the replacement switch (64, fig. 6-7) shaft towards you, rotate the shaft clockwise to the stop.
- b. Assemble the switch to the panel assembly

so that the moving contact and wiper contact of the rear wafer (as viewed from the rear) are positioned as shown in figure 7-1.

- c. Secure switch (64, fig. 6-7) to panel assembly with lockwasher (63) and nut (62).
- d. Solder the wires, which were removed in paragraph 7-5d, to the proper terminals on the switch.

- e. Replace and secure the panel assembly in the case (para 6-7).
- f. Replace knob (61, fig. 6-7) on shaft so that knob pointer is at INLET TEMP and tighten setscrews to secure knob to shaft of switch (64).

Section III. CHASSIS TEST CABLE

7-7. Description

The CHASSIS TEST cable (11, fig. 6-9) connects the detector assembly of the M43 detector to the M74 test set to allow testing of the detector assembly circuits.

7-8. Removal

- a. Perform preliminary procedures (para 6-60).

- b. Remove circuit card assembly (para 6-54) to expose tip jack terminals.

c. Using care to avoid damage to other leads, move branched wiring harness (20, fig. 6-6) clear of tip jack terminals to which the CHASSIS TEST cable leads are soldered (fig. 6-2).

- d. Pull insulation sleeves away from soldered terminals of connector.

e. Tag and unsolder CHASSIS TEST cable leads from tip jacks.

f. Provide access to terminals on connector (J6) (para 6-57c and d).

g. Tag and unsolder CHASSIS TEST cable leads from connector (J6) (fig. 6-2).

h. Remove connector (P1) end (16, fig. 6-9) of CHASSIS TEST cable from bracket (49) in housing (43).

7-9. Installation

a. Solder CHASSIS TEST cable lead wires to

tipjacks and terminals of connector (J6) (fig. 6-2).

b. Slide connector (P1) (16, fig. 6-9) end of CHASSIS TEST cable into bracket (49).

c. Place cable in clamp (42) and secure both clamps (42) to housing (43) with screw (41), lockwasher (44), and nut (45).

d. Install split grommet (38) around cable and slide into groove in housing (43).

e. Secure cover (34) with six screws (35). Replace panel assembly in the case (para 6-7).

APPENDIX A REFERENCES

FM 5-25
TB SIG 222
TM 3-6665-260-24P

TM 38-750
TM 740-90-1

Explosives and Demolitions
Solder and Soldering
Organizational, Direct Support, and General
Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) For Test, Set, Chemical Agent Automatic Alarm, M74, FSN 6665-854-4147
The Army Maintenance Management System (TAMMS)
Administrative Storage of Equipment

APPENDIX B

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items and items troop installed or authorized required by the crew/operator for operation of the M74 test set.

B-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. *Basic Issue Items List*—Section II. Not applicable.

b. *Items Troop Installed or Authorized List*—Section III. A list, in alphabetical sequence, of items which, at the distribution of the unit commander, may accompany the end time, but are not subject to be turned in with the end item.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings.

a. *Source, Maintenance, and Recoverability Codes (SMR)*.

(1) *Source code*. Indicates the source for the listed items. Source codes are:

Code	Explanation
P	— Repair parts, special tools, and test equipment supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
P2	— Repair parts, special tools, and test equipment which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
P9	— Assigned to items which are NSA design controlled: unique repair parts, special tools, test, measuring, and diagnostic equipment, which are stocked and supplied by the Army COMSEC Logistic System and which are not subject to the provisions of AR 380-41.
P10	— Assigned to items which are NSA design controlled: special tools, test, measuring, and diagnostic equipment for COMSEC support,

Code

Explanation

	—	which are accountable under the provisions of AR 380-41, and which are stocked and supplied by the Army COMSEC Logistic System.
M	—	Repair parts, special tools, and test equipment which are not procured or stocked, as such, in the supply system but are to be manufactured at indicated maintenance levels.
A	—	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	—	Parts and assemblies that are not procured or stocked because the failure rate is normally below that of the applicable end time or component. The failure of such part or assembly should result in retirement of the end item from the supply system.
X1	—	Repair parts which are not procured or stocked. The requirement for such items will be filled by the next higher assembly or component.
X2	—	Repair parts, special tools, and test equipment which are not stocked and have no foreseen mortality. The indicated maintenance category requiring such repair parts will attempt to obtain the parts through cannibalization or salvage. The item may be requisitioned, with exception data, from the end item manager for immediate use.
G	—	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DS and GS level. These assemblies will not be stocked above the DS and GS level or returned to depot supply level.

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above except those coded X1 and aircraft support items as restricted by AR 700-42.

(2) *Maintenance code.* Indicates the lowest category of maintenance authorized to install the repair part and/or use the special tool or test equipment for each application. Capabilities of higher maintenance categories are considered equal or better. Maintenance codes are:

Code	Explanation
C	Crew/operator maintenance
O	Organizational maintenance

(3) *Recoverability code.* Indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R —	Applied to repair parts, (assemblies and components), special tools, and test equipment which are considered economically repairable at direct and general support maintenance levels. When the item is no longer economically repairable, it is normally disposed of at the GS level. When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710-50. When so listed, they will be replaced by supply on an exchange basis.
S —	Repair parts, special tools, test equipment, and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T —	Higher dollar value recoverable repair parts, special tools, and test equipment which are subject to special handling and are issued

Code	Explanation
	on an exchange basis. Such items will be repaired or overhauled at depot maintenance activities only. No repair may be accomplished at lower levels.
U —	Repair parts, special tools, and test equipment specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value, or reusable casings or castings.

b. *Federal Stock Number.* Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. *Description.* Indicates the Federal item name and a minimum description required to identify the item. The last line indicates reference number followed by the applicable Federal Supply Code for Manufacturer (FSCM) in parentheses. The FSCM is used as an element in item identification to designate manufacturer or distributor or Government agency, etc, and is identified in SB 708-42.

d. *Unit of Measure (U/M).* Indicates the standard or basic quantity by which the listed item is used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, e.g., ea, in., pr, etc, and is the basis used to indicate quantities and allowances in subsequent columns. When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

e. *Quantity Authorized.* Indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfg. Code	(4) UNIT OF MEAS	(5) QTY AUTH
P—C—	6135-801-3493	BATTERY, DRY 6-3/4 volt dc BA1372/U (80063)	ea	1

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

The maintenance allocation chart (sec. II) lists the authorized maintenance functions assigned the maintenance categories for maintenance of the M74 test set. This chart is to be used by all levels of maintenance to insure complete support of the equipment.

C-2. Maintenance Functions

Maintenance functions authorized are limited to and defined as follows:

- a. *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.
- b. *Test.* To verify serviceability and to detect electrical or mechanical failure by use of test equipment.
- c. *Service.* To clean, preserve, charge, and add fuel, lubricants, cooling agents, and air.
- d. *Adjust.* To rectify to the extent necessary to bring into proper operating range.
- e. *Align.* To adjust specified variable elements of an item to bring to optimum performance.
- f. *Calibrate.* To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with certified standard.
- g. *Install.* To set up for use in an operational environment, such as an emplacement, site, or vehicle.
- h. *Replace.* To replace unserviceable items with serviceable like items.
- i. *Repair.* Maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.
- j. *Overhaul.* Normally, the highest degree of maintenance performed by the Army in order to minimize time work that is in process, con-

sistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. *Rebuild.* The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. *Symbols.* A letter (symbol) in the maintenance function column indicates the lowest level at which that maintenance function is to be performed.

C-3. Explanation of Format

a. *Column 1, Group Number.* A list indicating the number that is assigned to each group, component, assembly, or subassembly to facilitate references. The numbers are identical to, and in the same sequence as, those assigned to the same group, component, assembly, or subassembly in the repair parts and tools list.

b. *Column 2, Functional Group.* A list of groups, noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. *Column 3, Maintenance Function.* A list of maintenance functions. Each maintenance function applicable to a functional group entry will be designated by a single letter (symbol).

d. *Use of Symbols.* Symbols used in the maintenance function columns are as follows:

Symbol	Explanation
C	Operator/crew maintenance
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

e. *Column 4, Tools and Equipment.* A list of special tools and test equipment used in performing the authorized maintenance function.

Numbers shown in this column refer to tools and test equipment listed in section III.

f. *Column 5, Remarks.* Self-explanatory.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group / index number	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
100	MOUNTED PLATE ASSEMBLY													
	PLATE ASSEMBLY, MOUNTING	C								F			2, 3	
200	PANEL ASSEMBLY	C	O	O	D	D	D			O	H		2, 3, 4, 5	
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	WIRING HARNESS	F	F						H	F				
	CABLE ASSEMBLY													
300	ACCESSORIES													
	FITTING STOPPER ASSEMBLY	C							C	O				
	GAGE BLOCK ASSEMBLY	C							C	O				
	END GAGE BLOCK	C							C	O				
	GAGE ASSEMBLY	C							C	O				

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

Tool or Test Equipment Reference Code	Maintenance Code	Nomenclature	Tool Number (FSN)
1	O	TK-101/G Tool Kit, Electronic Equipment	5180-064-5178
2	F	TK-100/G Tool Kit Electronic Equipment	5180-605-0079
3	F	TK-105/G Tool Kit, Electronic Equipment	5180-610-8177
4	F	Multimeter; TS-352/U	6625-242-5023
5	D	Electronic Equipment Calibration Standards Set, Secondary Transfer	4931-621-7877

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By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS,
Major General, United States Army
The Adjutant General.

W. C. WESTMORELAND,
General, United States Army
Chief of Staff.

Distribution:

Active Army:

CNGB (1)
USAMB (2)
USAMC (5)
USAMUCOM (5)
USACDC (2)
USACDC Agcy (2)
USACDCEC (10)
CONARC (25)
ARADCOM (5)
ARADCOM Rgn (5)
OS Maj Comd (5)
Instl (2) except
 USAFACFS (4)
 USAECFB (4)
USMA (10)
Svc Colleges (10)
Br Svc Sch (10) except
 USACMLCS (50)
USATC (1)

USAMMCS (2)
USAPC (2)
USAIC (2)
Gen Dep (5)
Dep (5)
Army Dep (5)
EAMTMTS (1)
WAMTMTS (1)
MOTBA (1)
MOTBY (1)
MOTKI (1)
MOTSU (1)
USAMUCOM (Joliet) (25)
Arsenals (3) except
 Edgewood (100)
PG (5)
POE (1)
Ft Knox FLDMS (10)

ARNG & USAR: None.

For explanation of abbreviations used, see AR 310-50.

